This Week in The Iron Age

SEPTEMBER 5, 1940

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The Iron Age

SEPTEMBER 5, 1940

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Creation In Reverse

IN the account of the creation of the world, you will note that the groundwork was done in advance of the final introduction of Adam and Eve. First came the creation of day and night; then the firmament; then the land and the water; then the vegetable kingdom; then the whales and fishes; then the animal kingdom of cattle and beasts and finally man.

That is the sensible way to go about any creative job. Do first things first. Our armament program is headed for trouble because in the hysterical drive to make up for a long neglect of preparedness, effort is being put upon last things to the neglect of first things. And that won't work.

Orders placed for munitions do not mean a thing unless a firm foundation has been made upon which deliveries—in time—can be assured.

Man, the end product of creation, could not appear and survive until a foundation had been built for him in the way of land, sea and firmament. Airplanes, tanks, guns and shells require a similar preparatory foundation in the form of machine tools, small tools and gages. In an expanding munition program, capacity to produce these indispensable means of production must be increased in step with increased munition expectations, but *must precede them by from three to six months at least.*

Reliable estimates of our machine and small tool requirements show that 1941 capacity and output of these prerequisites must be stepped up fully 50 per cent. Gages essential to making and inspecting must be stepped up at least 100 per cent. And the time to step them up is *now*, from three to six months in advance of the munitions "on order."

You can have a brick house "on order" from now until doomsday, but it won't be built until you get the bricks.

Do not get the idea that the machine tool builders have not done a remarkable job of increasing output. This year the industry will produce collectively $400,000,000 worth of products. This compares with an output of $200,000,000 in 1939. Plants now, in general are running three shifts and at maximum capacity. But that is not enough. We will need an output of $600,000,000 in 1941 to keep pace with the munition program.

This means that new machine tool and gage plant capacity must be added at a cost of possibly $200,000,000. This needed extra capacity is not being built fast enough, first because the industry as a whole hasn't the money, second because it hasn't firm orders on which to proceed on this scale in inviting public financing, third because it is already overexpanded and does not have amortization protection against still more investment required.

Machine tool builders do not get the bulk of their business from Uncle Sam. Their orders trickle down to them from hundreds of concerns who have dealt with Uncle Sam, and who, unlike the tool builders have firm munition orders on a scale warranting plant expansion. This is proceeding "back side foremost" in the face of an emergency and in itself will put the munition program from three to six months behind where it should be.

Uncle Sam cannot of course order direct all of the specific machines that munition makers will need next year. But Uncle Sam knows that a 50 per cent step-up in this capacity is absolutely essential. And he can find some way to provide a safeguard which will enable the tool industry to undertake this vitally needed expansion.

Perhaps the $200,000,000 allocated to the President for use at his discretion, part of which is now building houses for future munition workers could be utilized for this purpose. That would indeed be building the land, sea and firmament before introducing Adam.

J. H. Van Deventer

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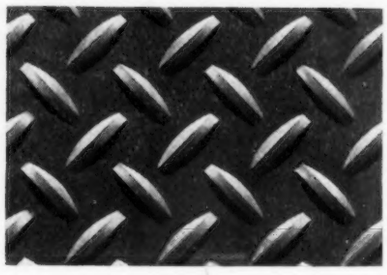

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Fatigue Failure

—The effects of stress raisers on the fatigue strength of metals and alloys. First of two parts of a correlated abstract

By GEORGE SACHS
Case School of Applied Science, Cleveland

o o o

THE majority of service failures of moving machinery is caused by fatigue. According to earlier conceptions no fatigue failure will be encountered if the stress cycles stay within certain limits, called the fatigue strength of the metal. Numerous extensive investigations have, therefore, been carried out to determine the fatigue strength values of the commercially important metals and alloys under varying conditions.

However, the service conditions may differ considerably from those which must be applied in laboratory tests to obtain reproducible strength values. Thus, polished specimens are generally used to determine the "regular" fatigue strength, but the values obtained in this manner often have been found to be much higher than those found when specimens are used which more closely approach service conditions.

It has been generally observed that the fatigue strength is affected in a similar manner by the following three types of "stress raisers":

(1) Machined notches,

(2) Corrosion, simultaneous with fatigue, and

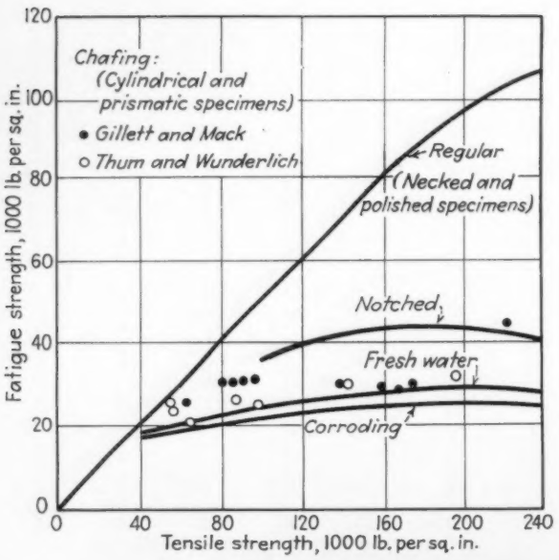
(3) Chafing.

The regular fatigue strength is usually improved by both cold work and heat treatments which also increase the tensile strength of the metal. This is particularly true for the steels, the fatigue strength of which is for all conditions about 50 per cent of the tensile strength. (See Fig. 1.) There is not much information available on the effect of different treatments on the fatigue strength of other alloy types; and there exists no simple relation between fatigue strength and tensile strength except for steels. The fatigue strength of cold worked and heat treated metals in the presence of stress raisers has been given particularly little attention as yet.

The close relation between the three types of stress raisers is not generally recognized as yet. It is however, well known[1] that notches, as well as corrosion, reduce the conventional bending fatigue strength of steels, the reduction being greater the higher the tensile strength and the regular fatigue strength of the steel (see Fig. 1). It has been similarly observed that cylindrical and prismatical specimens break under chafing action within the grips and yield a low fatigue strength that depends little upon the tensile and regular fatigue strengths of the steel.[2, 3] Thus in any one of these three special types of fatigue, little benefit is derived from alloying and heat treatment.

This fact is probably of more general importance than has been recognized as yet. Several instances have become rather famous in which the replacement of soft steels by heat treated high strength steels resulted in fatigue failures which have not been adequately explained as yet. Applications in which alloying and heat treatment failed to improve fatigue strength in service are the piston rods (see Figs. 2 and 3) of a diesel driven ocean liner[4] and wire for suspension bridges.[5] In the first case a combination of stress raisers, such as notching, corrosion and residual stress was found to exist. In the latter case the presence of a chafing action may have contributed to the failure.

The analogy between the three types of stress raisers also holds true for



ABOVE

FIG. 1—The effect of different stress raisers on the fatigue strength of steel (Bullens, Battelle).

o o o

BELOW

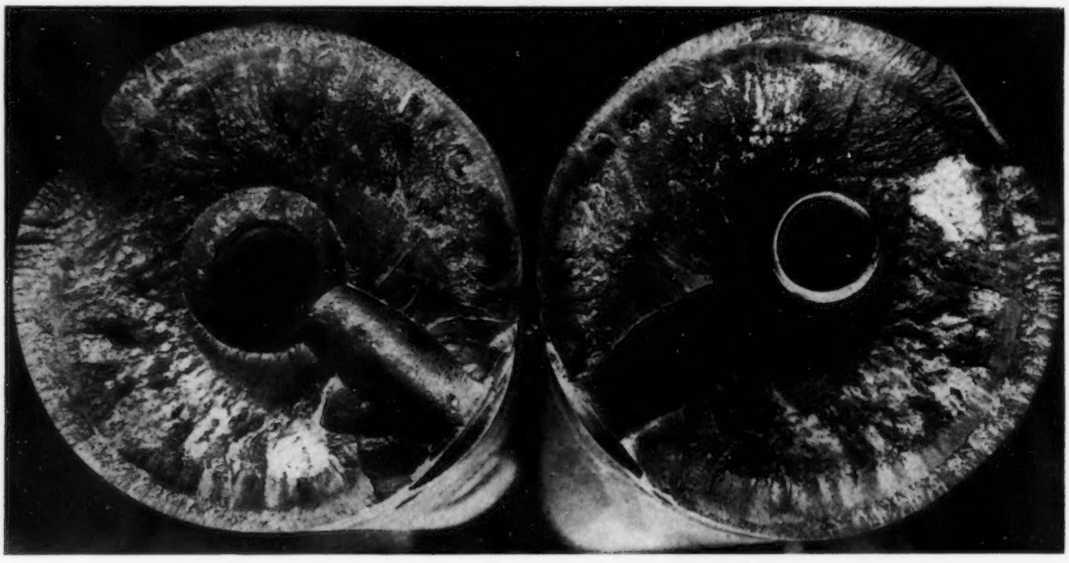
FIG. 2—Fatigue break of a 10-in. diameter diesel engine piston rod, caused by the simultaneous action of very low fatigue service stresses (±4550 lb. per sq. in.), the transverse bores, the corrosive effect of the coolant, and high residual stresses (±30,000 lb. per sq. in.)

o o o

steels is almost constant and only a small fraction of the regular fatigue strength is retained. Thus, no benefit is derived from alloying, cold work or heat treatment (see Fig. 6) regarding the fatigue properties if high stress raisers are present.[1, 9]

Comparing different alloys of the same strength (see Fig. 4), the effect of notching on nickel and nickel alloys is apparently slightly lower than on steels. The fatigue strength of copper, aluminum and magnesium alloys, however, is at least twice as much reduced by a specific notch as that of a steel of the same strength.

The relative effects of notches on torsion and bending fatigue conform to the magnitude of the stress peak which, for a specific notch, is differ-



the beneficial effect of local plastic deformations at the inherent location of the fatigue fracture. Different processes such as surface rolling, peening and shot-blasting can be used to reduce the harmful effect of any of these stress raisers. This will be discussed later in detail.

Notched Specimens

The reduction of the fatigue strength by a notch, hole and fillet that is comparatively small in relation to the dimensions of the test specimen depends upon two factors (see Fig. 4), first, the sharpness of the notch—which can be measured by the stress peak calculated according to the laws of elasticity—and second, the nature and strength properties of the metal.[6, 7, 8, 9, 10]

Within a specific group of alloys, such as the steels (see Fig. 1), the notch fatigue strength of high strength

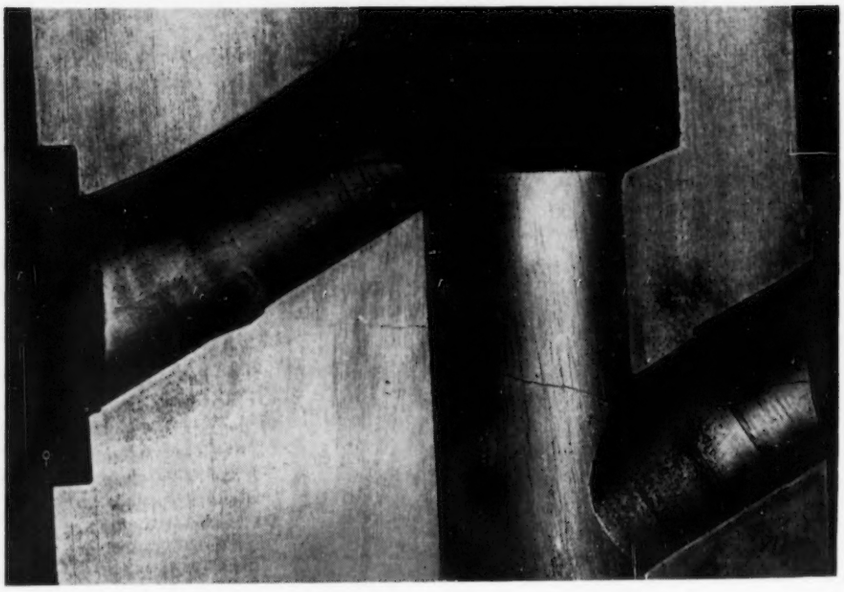
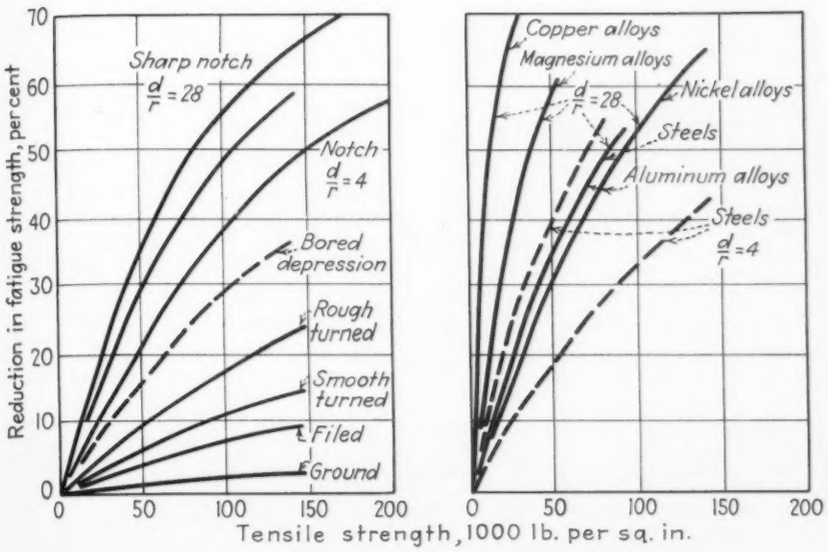


FIG. 3—Longitudinal section of a 10-in. diameter piston rod, showing the development of fatigue cracks in the transverse bores.



ABOVE

FIG. 4—Reduction in bending fatigue strength of steels and various metals caused by notches of different types (McAdam and Clyne).

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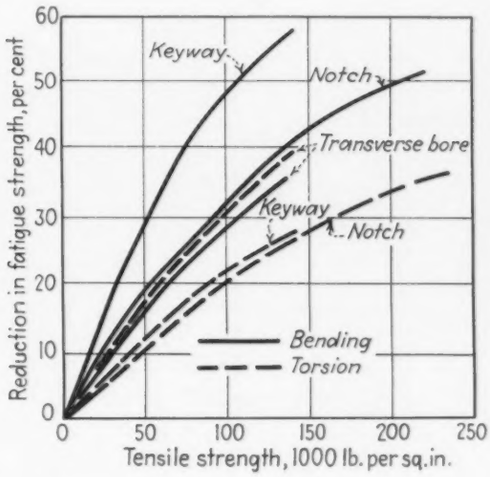
AT RIGHT

FIG. 5—Reduction in the bending and torsion fatigue strengths of steels caused by notches of different types (McAdam and Clyne).



ent in torsion and bending.[9] For a circumferential groove the stress concentration factors due to torsion and bending (or tension) respectively are:

$$1+\sqrt{\frac{d}{r}} \quad \text{and} \quad 1+2\sqrt{\frac{d}{r}}$$

where d = depth of notch, and r = radius of fillet (notch ground).

From this formula percentage reductions in torsion fatigue by notching may be expected, ranging from two-thirds to one-half of the reductions of the bending fatigue. Actually (see Fig. 5) ratios between 0.84 and 0.75 have been observed.[6, 11] For a transverse cylindrical hole, the theoretical relation is reverse, and in torsion about four-thirds of the notch effect in bending may be expected and has been actually observed (see Fig. 5). A keyway,[6, 12] on the contrary, has much less effect on the torsion than on the bending fatigue strength (see Fig. 5).

The effect of notches on the tension-compression fatigue strength is approximately of the same magnitude as the effect of notches on the bending fatigue strength.[6]

The surface condition of the fatigue specimens has a considerable influence on the fatigue strength, particularly of high strength steels. Rough machining has a notch effect corresponding to about 40 per cent of the attainable maximum (see Fig. 4), while other types of surface finishing have a smaller influence.[6] Unmachined high strength steels of the type used for springs, possess particularly low fatigue strength values (about 20,000 lb. per sq. in.), due to the combined effects of surface irregularities, inclusions, cracks and decarburization, while mild steels in the as-rolled condition (without machining) may have a considerably higher fatigue strength.[13]

The effect of notching appears to increase with the section size;[14, 15] however, the regular fatigue strength generally also moves toward lower values if the dimensions of the specimens are increased. This has been particularly observed in magnesium alloys[16]

The relation between the regular fatigue and the notch fatigue strength is not of a simple type. It has been observed that cast iron[17] and some cast aluminum alloys[18] possess little notch sensitivity and that coarse grain steels exhibit considerably higher notch fatigue strength (see Fig. 6) than stronger but fine grained steels.[19] The cast semi-steels, such as used by Ford, also appear to be superior to wrought steels regarding the absolute value of the notch fatigue strength.[11]

Corrosion and Fatigue Strength

Corrosion of the metal prior to the fatigue test acts fundamentally in the same way as a mechanical notch.[6] The progressing reduction of the fa-

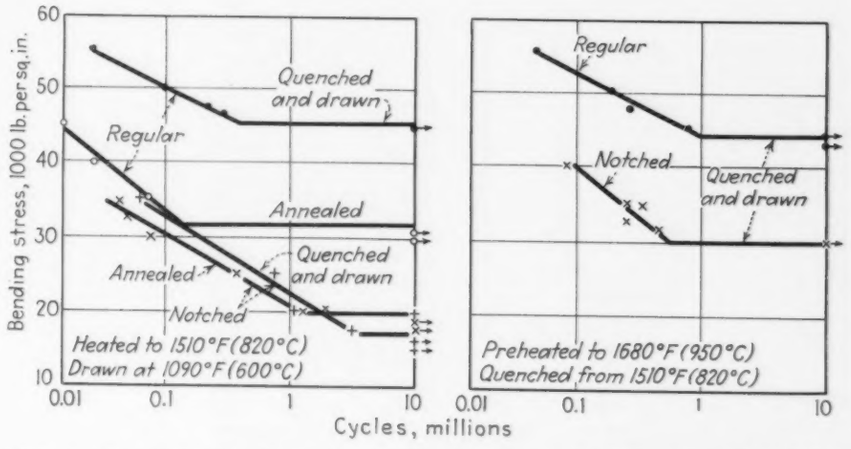


FIG. 6—The effects of tension and austenitic grain size on the fatigue strength and the notch fatigue strength of a "coarse grained" 0.37 per cent carbon steel (Brophy).

tigue strength with increasing time of corrosion can be attributed to the gradual increasing sharpness of the notch.

The effect of corrosion acting simultaneously with the fatigue strain depends primarily upon the medium of corrosion. This subject has been extensively reviewed in the literature.[20]

The atmospheric action may already be a factor in the fatigue of some metals, as many metals exhibit slightly higher fatigue strength values if tested in vacuum than if tested in air.[21] Saline water has a much stronger effect than fresh water. The corrosion fatigue strength of steels[3, 8] obtained with fresh water ranges approximately as high as that observed in the presence of the most severe types of mechanical notches, while the corrosion fatigue strength obtained with saline water is generally considerably lower (see Fig. 1).

The fatigue strength of some cast aluminum alloys is little affected by simultaneous corrosion in fresh water, while saline water causes a reduction of about 15 per cent.[18]

Corrosion has a particularly damaging effect on the fatigue strength of magnesium alloys,[16, 22, 23] while beryllium bronze has a corrosion fatigue strength[24] above that of stainless steel, which is not superior to carbon steels in this respect.

The fatigue strength of notched steel specimens and particularly of specimens with a circular hole is further reduced by simultaneous corrosion.[25]

Ed. Note: Next week the author concludes this very interesting correlated abstract by discussing chafing fatigue effect of surface working, etc.

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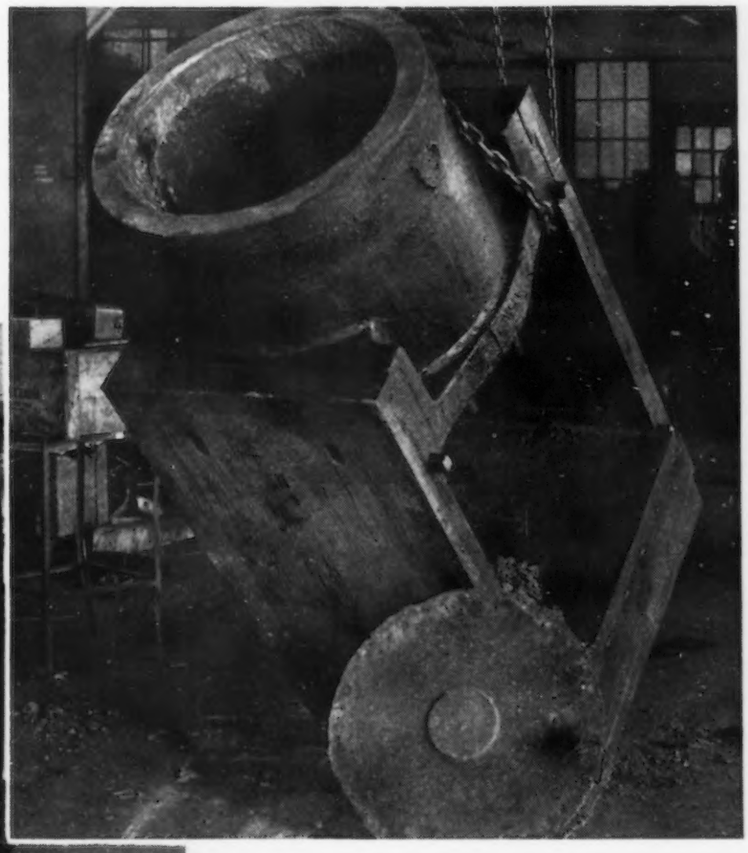
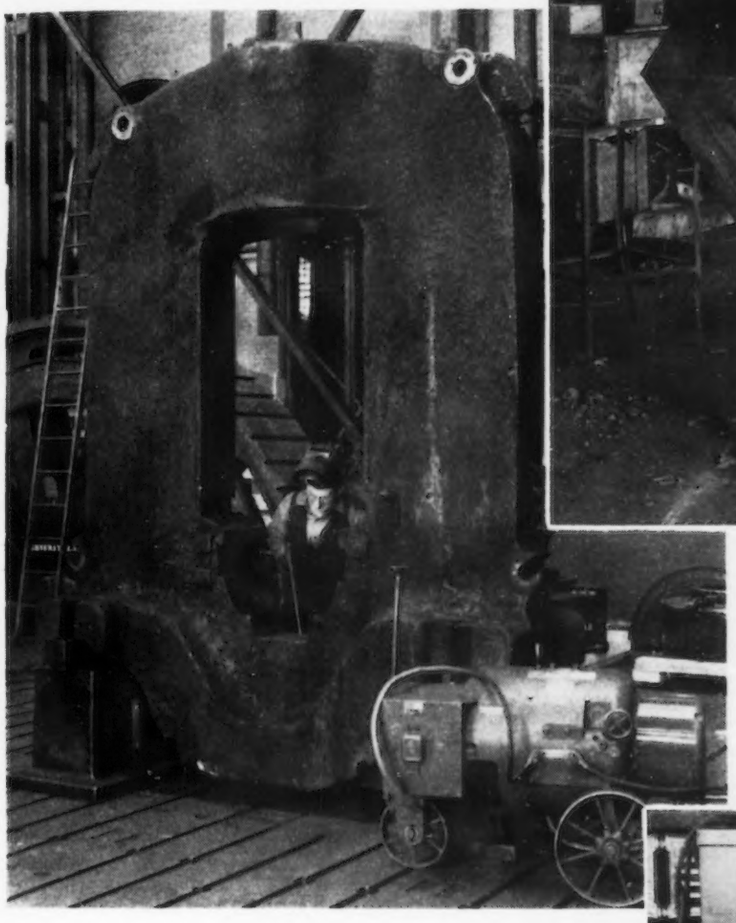
. . . Arc Welding Ingenuity . . .

AT RIGHT

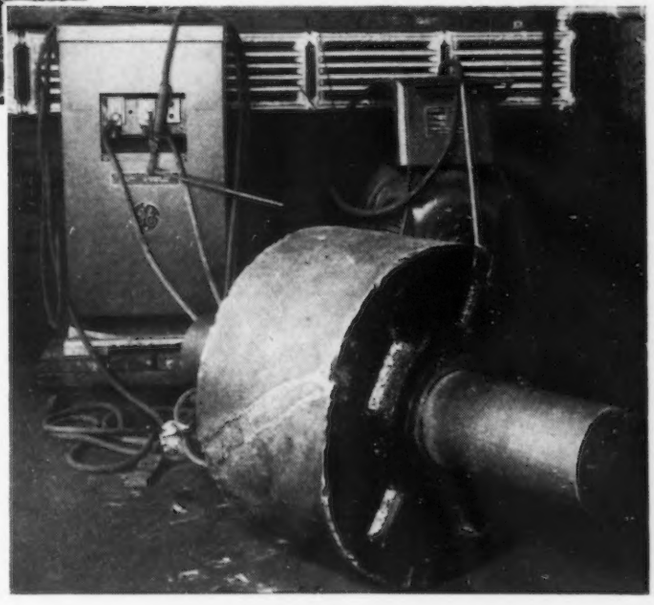
WHEN the bottom of a steel casting, a part of a hydraulic press from a rubber mill, became so porous that it had to be replaced, arc welding came to the rescue. The bottom was cut out by an acetylene torch and replaced by a 2¼-in. steel plate, arc welded into place. The job was done at a considerable saving by the Menna Welding Co., Toledo, using G-E welding equipment.





BELOW

BY using arc welding in fabricating a device of a trunnion for a rotary kiln, the Menna Welding Co. saved 20 per cent of the cost of a competitive article. The heavy parts were cut and shaped by the Manufacturer's Steel Supply Co., Toledo, and arc welded into the complete device shown here, using a G-E 500-amp. welding transformer and W-24 electrodes. The trunnion is made of boiler plate steel 2¼ in. thick, is 30 in. in diameter, and weighs approximately 2500 lb.



ABOVE

WHEN a large steel plant found that its sheet mill roll frame was badly worn, it was repaired quickly by arc welding. The mill was shut down Friday night, then dismantled, and the 41,000-lb. cast steel housing was delivered to the machine shop of the Canadian Westinghouse Co. Saturday morning. Building up the surface to permit both the feet and bearing recess to be machined to the original contours and size required 405 cu. in. of weld metal weighing 115 lb. This was obtained from 160 lb. of ¼-in. down-hand welding electrodes, thus showing an over-all deposit efficiency of 72 per cent of the electrode used with the Flexarc welders. The welding was completed Saturday night and the frame was then handed over to the machine shop.

Dustless and Sliverless

By W. H. BASSETT, JR.
Manager of Metallurgical Development, Anaconda Wire & Cable Co., Hastings-on-Hudson, N. Y.

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THE manufacturer of electrical apparatus cannot take for himself entire credit for having discovered the need of a smooth, sliverless copper wire. A Connecticut Yankee farmer expressed such a need some 75 years ago. This farmer wanted a smooth copper wire from which to make a ring for his bull's nose—the ring must not irritate and thus infuriate the bull. Since that day, the copper industry has improved both the product and the method of manufacture so that it may now correctly state that it has the answer to the request expressed by L. H. Burnham in his excellent paper, "The Need of a Better Quality of Copper in Apparatus Manufacture." [1]

The steps taken in arriving at the present commercial development are as follows:

(1) Bull ring wire.
(2) Sand scoured wire.
(3) Extruded rods.
(4) Die scalped rods.
(5) Double scalped copper.

Bull ring wire was made from copper wire bars which were either forged or hot rolled—followed by a single die drawing operation. The metal then was given a relatively high temperature anneal in an oxidizing atmosphere and quenched in water. Loose slivers, if present, were "burned" or oxidized so that in quenching and subsequent acid cleaning, they were entirely removed. In 1890 this was a standard product of Wallace & Sons, Ansonia, Conn., a predecessor of the American Brass Co.

As an ingenious method of removing the objectionable slivers, John F. Moody, superintendent of the Ansonia plant of the Coe Brass Co., invented sand scouring in 1898. In this operation the defects such as burrs, slivers, dust, etc., were pulled out by the roots leaving a hole or depression in the surface of the magnet wire. The scouring of the copper with sand was less expensive than the repeated open-fire annealing operations of the bull ring process. The users of the wire did not object to the holes or depressions in the surface as long as the projecting defect, which would be a hazard to electrical insulation, had been removed.

In 1906, the first extrusion press was installed by the Torrington plant of the Coe Brass Co., a forerunner of the American Brass Co. By means of the extrusion press, it was possible to produce a dustless, sliverless copper. A copper billet was raised to red heat and extruded into a perfect

[1] Wire and Wire Products, October, 1937.
[2] "Production of Copper from Mine to Mill," by W. H. Bassett, Jr., Wire and Wire Products, October, 1937, Vol. XII, p. 629.
[3] "Metals Used in the Development of Power Cables," by W. H. Bassett, Jr., Metals and Alloys, July, 1937, Vol. VIII, p. 185.

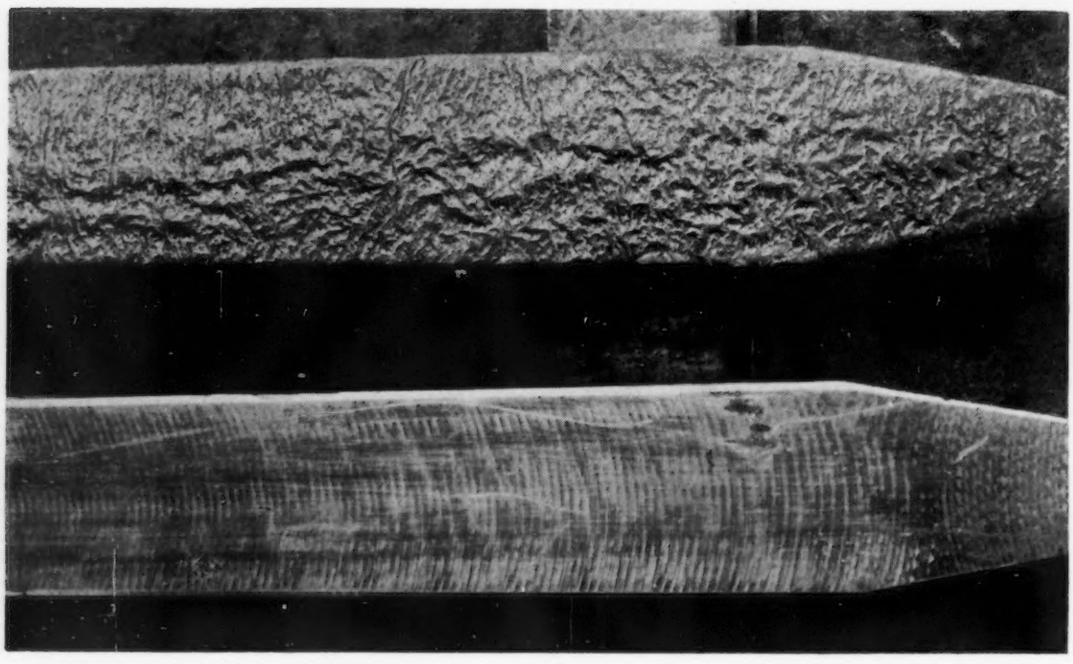

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FIG. 1 — Details of crinkled set surface of standard wire bar and smooth surface of scalped wire bar. One-fourth natural size.

o o o

Wire . . .

—The copper industry removes the entire original surface of the metal to meet exacting requirements of apparatus manufacturers

surface rod. That is, the heated billet was inserted in a steel cylinder and hydraulic pressure applied at one end by means of a cylindrical ram slightly smaller than the diameter of the billet. At the other end of the extrusion cylinder, the metal was forced through a single or multiple-hole die to form the extruded rod. The outside surface of the billet was shaved off during the extrusion operation. Therefore, any surface imperfections in the original castings were entirely eliminated. This process was, however, too expensive to be adopted by the users of magnet wire.

In the Waterbury mills of the American Brass Co. another unique method of producing dustless and sliverless wire was developed prior to 1915 in connection with the manufacture of high-quality brass and phosphor bronze. This method was also used in the Ansonia plant for special alloys such as Tobin bronze. In order to economically remove the original surface of the brass, phosphor bronze, or Tobin bronze, the rods were drawn through a reversed sharp-faced die which peeled the surface. The method was a success as the customers for these materials were willing to pay an extra premium for a perfect surface product.

Double scalped copper, as the term implies, is material which has received two scalping operations. First, the wire bar is scalped to remove the irregular set surface. This operation also removes the area of oxide concentration so that a uniform structure in the rod is obtained throughout the entire cross-section. In the second scalping operation, the entire surface of the hot rolled rod is removed. Surface, dust, scale, and slivers are eliminated when the surface metal is peeled from the rod by means of a scalping die.

The industry thus now has several ways in which dustless, sliverless copper wire can be produced:

(1) A standard scalped wire bar can be hot rolled, draw die scalped and drawn.

(2) An end-poured wire bar can be hot rolled, draw die scalped and drawn.

(3) Oxygen-free or deoxidized high-conductivity wire bars can be hot rolled, draw die scalped and drawn.

(4) Coalesced[2] cathodes can be extruded into rod and drawn to the required size.

(5) Standard copper billets can be extruded into rod and drawn.

(6) Oxygen-free or deoxidized, high-conductivity copper billets can be extruded into rod and drawn.

The selection of the particular process for producing the dustless, sliverless copper wire will depend on the economics of the situation, and the exact requirements of the apparatus manufacturer. Naturally, the user of copper wire cannot afford to pay a premium for special properties unless, in actual service, he can prove that he will get longer life and continued unfailing operation from his apparatus.

During the initial development of the electrical industry in this country, it was natural for the copper wire manufacturers to supply bull ring wire as a means of obtaining the best available high quality magnet wire for these first successful dynamos. Some of the early electrical machinery manufacturers objected to the cost of the bull ring process but, on the other hand, were not satisfied with the wire drawn from hot rolled rods. The ordinary wire contained slivers or burrs of sufficient magnitude to create points of concentrated electrical stress in the insulation, thus causing early electrical failure and short-circuit of the

FIG. 2—Typical examples of surface noted when making laboratory bend tests on 0.104-in. copper wire. At 5 diameters.

FIG. 3—(Left) Partial cross-section of hot rolled rod with surface imperfections. (Right) Partial cross-section of die scalped rod. Note smooth edge. Both at 10 diameters.

windings. Occasionally some of these defects would even penetrate partly or wholly through the insulation.

The designers of electrical apparatus have been continually increasing the unit transformer voltage. They have likewise decreased the weight and size of their apparatus. It was natural, therefore, that they should expect the utmost from the insulation on their magnet wire. Peripheral speeds of rotating apparatus have been increased which emphasize the effects of vibration, and the concentration of stresses at surface imperfections resulting in fatigue failures. These and other factors have contributed to the desire for a quality superior to the sand scoured magnet wire.

Manufacturers who have used dustless, sliverless, double-scalped copper are perfectly willing to pay a premium for this superior product. They find that the increased efficiency in the production department and the improvements in the finished product fully justify the use of die-scalped rods; not only in their flat and square wire departments but also in their high-speed drawing of fine copper wire.

The advantages of double scalped copper are based on the greater uniformity in the original copper castings; the improvement of the hot rolled rod, and the resulting refinement of the subsequent fabricating operations.

The user of copper wire is familiar with the well-known set surface of a standard wire bar. Fig. 1 shows the typical appearance of a standard copper wire bar, and also the appearance of the wire bar after the crinkled set surface has been removed by a machining operation. By removing the oxide concentrations of the set surface in the scalping operation, all four sides of the wire bar are made uniform.

Having started with a superior casting, the difference in the copper wire is more readily demonstrated by examining the hard drawn material. The tensile strength and elongation tests are not critical enough to show any marked difference in hard copper line wires produced from different types of wire bars.[4] Special tests, however, demonstrate the difference in quality of the wires fabricated from different types of castings.

Oxygen-free copper, due to the very low oxygen content, shows a greater resistance to fracture when subjected to right angle bends. The samples made from scalped, end-poured, and oxygen-free wire bars offer greater resistance to fracture under torsional stress due to the more uniformly perfect surface. The surface characteristics are found to be quite different when the wire is subjected to a wrap test. The samples produced from the

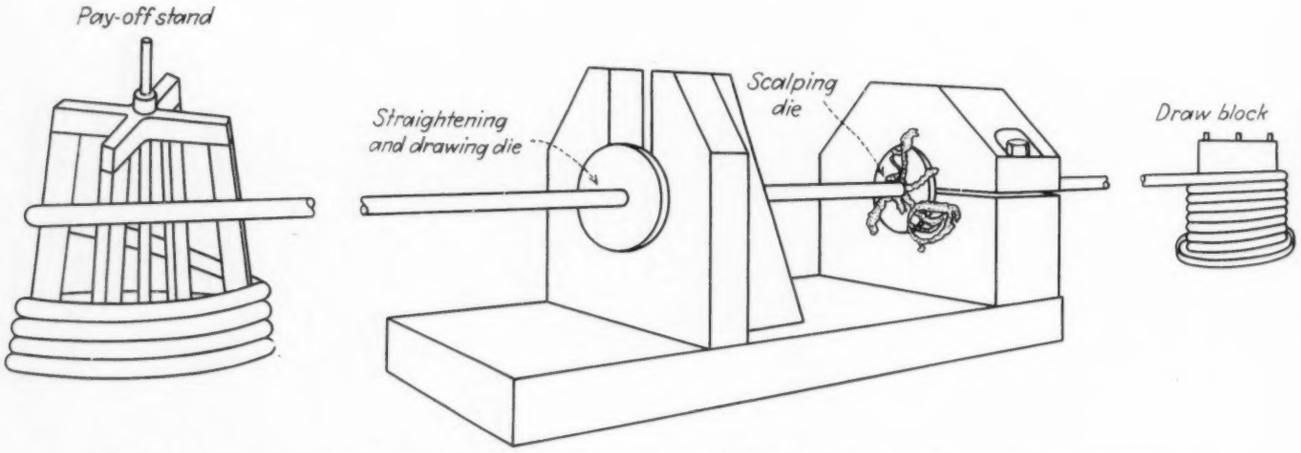


FIG. 4—Arrangement whereby wire is scalped in a reversed die immediately after the drawing operation.

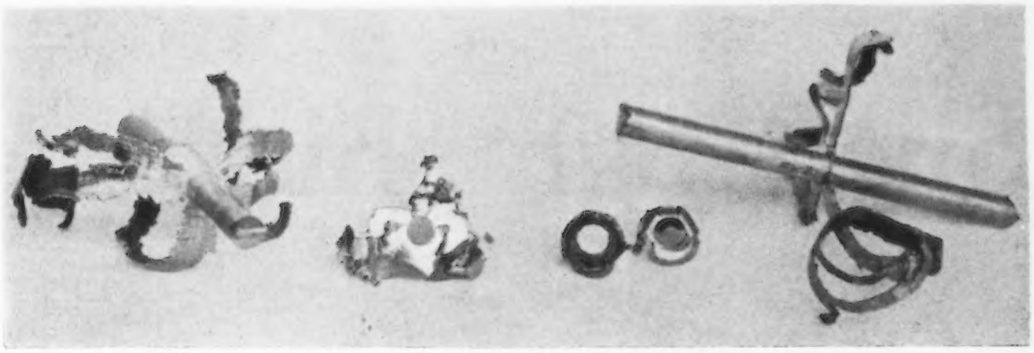


FIG. 5—Specimens showing how surface skin is peeled from rod by means of flat-faced reversed die. One-half natural size

standard commercial wire bars will show surface cracks in the "set" (area of oxide concentration) when bent severely. The uniform surface free from cracks obtained in a satisfactory bend test of scalped copper is shown in Fig. 2.

The superior quality obtained by the double scalping method is readily demonstrated by reference to the accompanying photomicrographs. A section through a typical surface imperfection on a hot-rolled copper rod is shown in Fig. 3, at a magnification of 10 diameters. The corresponding cross-section of a die scalped rod also is shown in Fig. 3. The marked freedom from all imperfections at the edge of the wire is very noticeable.

The method of die scalping copper rods is shown schematically in Fig. 4. The surface is actually removed in the same manner that the skin is peeled from a banana, and Fig. 5 shows some specimens that were cut from a copper rod during the operation. The actual removal of metal from the surface of the rod eliminates rolling defects and produces a wire free from burrs, slivers, seams, laps, fins and dust.

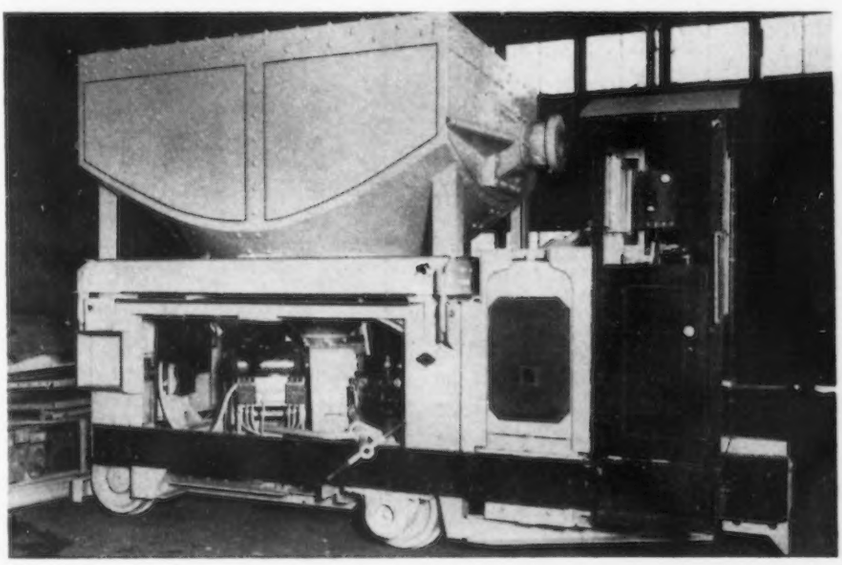
Extensive research and development, both in the laboratory and in the field, have shown that the magnet wire produced from these perfect surface rods (double scalped) is especially suited to the exacting requirements of copper windings in transformers, motors, generators and coils used in the utility, air-conditioning, transit and other industries served by electric power.

Blaw-Knox Offers New Dolomite Thrower

AN improved dolomite throwing machine for making up open-hearth banks has been developed by Blaw-Knox Co. A principal advantage of the improved machine (illustrated here) is that it operates under its own power. A generator, driven by either a diesel or gasoline engine, develops the electric power needed for the motor which drives the dolomite throwing mechanism, and also for the motor which propels the machine along the rails, thus enabling the machine to transport dolomite from storage as well as throwing it to the furnace banks. Thus crane service is not necessary.

The hopper is removable from the machine proper and is fitted with trunnions for engagement with the hot metal ladle hooks of the floor crane, so that it can be used by itself to transport dolomite from storage to the open-hearth floor. Hopper capacities are made to suit local conditions and are generally designed to hold sufficient material to make up banks for three heats.

Another improvement is provision, where desired, of a divided hopper, so that two classes of material, e.g., raw and double burned dolomite, can be handled at the same time by the mere manipulation of separate levers.



Spectrographic Analysis

THIS article gives a detailed description of the procedure adopted for the spectrographic analysis of pig lead. In the first part, last week, the author discussed line identification, qualitative sensitivity limits, control of excitation, preparation of standards, and evaluation of photographic density. Herein, in conclu-

TREATMENT OF DENSITOMETRIC DATA: Generally speaking, in any reliable spectrographic method, it is possible for the operator to control satisfactorily all variables except the photographic response of the plate used to record the spectrum. Because of this non-uniformity acceptable practice calibrates each plate to correct for such fluctuations.

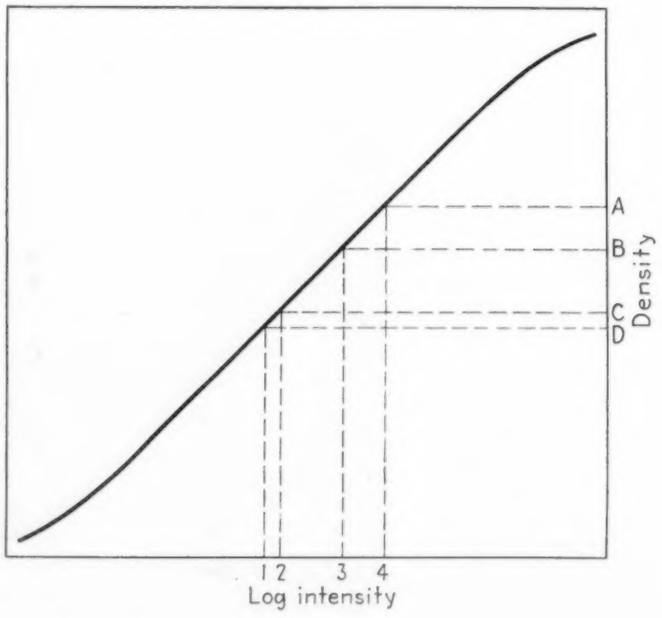
A common plate calibration procedure involves essentially the registration of a series of spectra differing effectively only in relative intensity. Measurements on this series evaluate plate response as a calibration curve depicting the manner in which photographic density increases as a function of increasing relative incident intensity. Subsequent interpolation upon the calibration curve of density as measured for an impurity line on an unknown spectrum serves to give the corrected relative intensity of the impurity radiation in the source, this intensity being a measure of percentage content of impurity in the sample.

This type of plate calibration, unless high-speed photometers are available, is rather time-consuming in that on each plate one must register and measure an appropriate number of calibrating spectra. Moreover, there is the ever-present possibility that a given plate is not uniform over its entire surface so that plate characteristics as measured by the calibrating spectra do not hold for the area upon which unknown spectra are registered.

In the procedure to be described here each unknown spectrum acts, effectively, as its own plate calibrating agent. The essential advantages of the method are that no extraneous calibrating spectra need be registered and that the plate area actually calibrated is more nearly the same as that upon which the impurity line to be measured is registered.

The curve of Fig. 4 represents the manner in which the density of a photographic deposit varies as a function of the logarithm of the intensity at the source, the time of exposure being held constant. Following an initial induction period (the toe), the density is linear with respect to log I. It should be noted here that it is within this linearity range that the density changes most rapidly with log I and, hence, if possible, attempts should be made to work in this region. With a photometer of the usual type the exposure is usually controlled so that only seldom does a density value penetrate far into the linearity range because photometer readings of dense lines are insensitive to small changes in density. One advantage of the visual Gaertner densitometer is that it allows fairly accurate estimations even when density values are in the range as high as 2 or 3 units

From Fig. 4, it is evident that the ratio b-d/a-c of the four density values a, b, c and d is independent of the slope (*gamma*) of the linear portion of the D-log I curve. Thus, b-d/a-c = (log I_3-log I_1)/(log I_4-log I_2). In the specific case of the analysis for Ag in lead, I_3 is the intensity of the Ag line, I_1 is the intensity of the background radiation measured near the Ag line, I_4 is the intensity of a neighboring Pb line, and I_2 is the intensity of the background adjacent to this reference Pb line. If we assume that excitation conditions are controlled to the extent that I_1, I_2 and I_4 are constant, the measured value of the ratio b-d/a-c is dependent only on the value of I_3 (and, hence, only on the concentration of Ag in the unknown lead), this ratio being inde-



LEFT

FIG. 4—Typical plate response curve.

RIGHT

FIG. 5—Silver working curve.

# of Lead and Its Alloys

By J. N. MRGUDICH
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sion, is given a method of correction which minimizes the necessity for plate calibration and the plotting of working curves. Also, reproducibility is demonstrated. Typical analyses are given of pig lead samples from different suppliers. The same procedure is applicable to the analysis of antimonial lead and also to calcium lead.

pendent of plate contrast and to a certain extent (depending on the magnitude of the linearity range) of time of exposure. The only prerequisite of the method is that all measured density values fall on the straight-line portion of the D-log I curve. There has been found no difficulty in controlling exposure time to satisfy this linearity requirement. An inherent assumption in the above treatment is that the value of plate *gamma* is independent of the four wavelengths involved (Pb line and background, Ag line and background). This is not strictly true but the differences in *gamma* are so slight that no appreciable gain in accuracy was observed when corrections for these were made.

Plotting Working Curves

In Table I are given densitometric data as measured for the 3383 Ag line and the reference 3221 Pb line of eight master standards. Background densities, in parentheses, were estimated as close as possible to the spectral line involved. The concentration values of column 2 were calculated on the basis of the amount of Ag added to the starting 6-9 lead as just described.

The working curve correlating the ratio b-d/a-c with the logarithm of the Ag concentration is illustrated in Fig. 5.

Reproducibility of Data

In columns 2 and 3 of the upper portion of Table II are given the densitometric data obtained on a consecutive set of 18 different plates, each carrying the spectrum of sample No. 222. Observed line densities, it will be noticed, are fairly constant and indicate that excitation and plate response were both reproducible.

In the case of plates 5, 16-1 and 16-2, even though the same excitation was used, wide variations exist in plate response. The ratio b-d/a-c, however, remains fixed. This is considered as strong evidence indicating the validity of the correction procedure just outlined.

Illustrative data are given here only for the determination of Ag in Pb, but the same reproducibility was observed with Cu, Bi and Cd.

Accuracy of Data

The accuracy, or correctness, of the analytical results depends, obviously, upon the reliance that may be placed upon the compositions of the standard samples.

It was found impractical, because of a limited supply of 6-9 lead, to prepare these standards in amounts sufficient for check chemical analyses.

The Ag, Cu and Cd standards were checked by duplicate synthesis and agreement was obtained. Most of the master standards were spectrographically analyzed by an independent laboratory, the only serious discrepancy being a reported 0.04 per cent Bi content in the standard synthesized to contain 0.05 per cent Bi. Finally, many lead samples spectrographically analyzed were subjected to chemical analysis. No difficulty has been encountered in checking Ag and Cu and Bi in amounts less than 0.075 per cent. In the range 0.075 to 0.10 per cent spectrographic Bi tends consistently to run slightly higher than chemical Bi. For example, in a series of different samples the spectrographic Bi was 0.098, 0.105, 0.108, 0.084, 0.081 and 0.106 per cent, while corresponding chemical Bi was 0.095, 0.095, 0.095, 0.082, 0.078, and 0.90 per cent. A more concordant set of samples

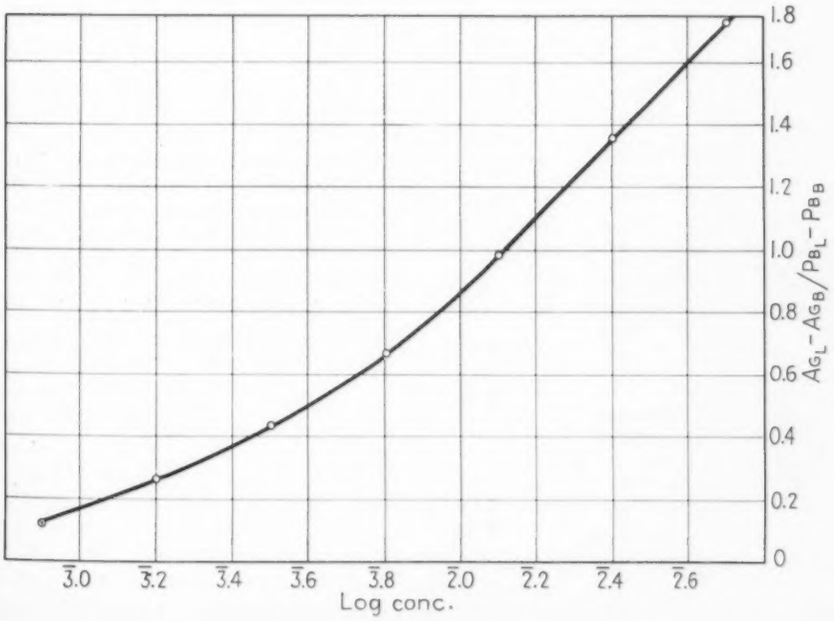

TABLE I—Densitometric Data as Measured for Eight Master Standards

Standard No.	Ag	log Ag	Observed Scale Densities 3383 Ag b d	3221 Pb a c	b-d	a-c	b-d/a-c
1	0.1022	$\bar{1}$.0094	67.2(18.7)	43.9(17.7)	48.5	26.2	1.85
2	0.0511	$\bar{2}$.7084	62.9(18.3)	43.9(18.1)	44.6	25.8	1.73
3	0.0256	$\bar{2}$.4082	53.9(18.5)	44.4(18.2)	35.4	26.2	1.35
4	0.0128	$\bar{2}$.1072	44.0(18.0)	43.8(17.4)	26.0	26.4	0.98$_6$
5	0.0064	$\bar{3}$.8062	33.6(17.3)	41.7(17.1)	16.3	24.6	0.66
6	0.0032	$\bar{3}$.5051	30.4(18.8)	44.8(18.2)	11.6	26.6	0.44
7	0.0016	$\bar{3}$.2041	25.8(18.8)	44.8(17.9)	7.0	26.9	0.26
8	0.0008	$\bar{4}$.9031	21.2(18.0)	44.1(17.9)	3.2	26.2	0.12

TABLE II—Densitometric Data for Eighteen Different Plates

Plate No.	Observed Scale Densities 3383 Ag b (d)	3221 Pb a (c)	b-d	a-c	b-d/a-c	Ag
25	33.3(19.1)	41.8(19.1)	14.2	22.7	0.626	0.0058
26	32.8(19.1)	40.9(18.8)	13.7	22.1	0.620	0.0057
27	34.8(20.0)	42.4(19.9)	14.8	22.5	0.658	0.0063
28	32.4(18.6)	40.8(18.2)	13.8	22.6	0.611	0.0056
29	32.3(18.0)	41.1(17.8)	14.3	23.3	0.614	0.0056
30	33.3(18.8)	41.4(18.7)	14.5	22.7	0.639	0.0060
31	33.3(19.0)	42.0(18.9)	14.3	23.1	0.619	0.0057
32	32.6(18.5)	40.5(18.6)	14.1	21.9	0.644	0.0061
33	34.1(18.7)	42.2(18.8)	15.4	23.4	0.658	0.0063
34	30.2(16.8)	38.3(16.5)	13.4	21.8	0.615	0.0057
35	33.9(18.2)	43.0(18.4)	15.7	24.6	0.638	0.0060
36	34.4(18.8)	42.8(18.9)	15.6	23.9	0.652	0.0062
37	34.9(19.3)	43.1(19.4)	15.6	23.7	0.658	0.0063
38	33.2(18.4)	41.2(18.1)	14.8	23.1	0.641	0.0060
39	32.9(19.2)	41.8(18.9)	13.7	22.9	0.598	0.0054
40	34.4(19.3)	43.2(19.9)	15.1	23.3	0.648	0.0062
41	34.0(18.9)	43.2(19.4)	15.1	23.8	0.634	0.0059
42	31.9(18.1)	39.6(17.7)	13.8	21.9	0.630	0.0059
					Average =	0.0059
					Average deviation from mean =	0.0002$_8$
					Average deviation from mean (per cent)	3.9
5	23.8(11.0)	31.3(11.0)	12.8	20.3	0.630	0.0059
16-1	16.9(6.9)	22.8(7.1)	10.0	15.7	0.637	0.0060
16-2	40.1(21.1)	49.6(20.0)	19.0	29.6	0.642	0.0060

TABLE III—Analytical Data

Supplier	Sample No.	Ag	Cu	Bi	Cd
A	343	0.0050	0.0006	0.021	...
	356	0.0052	0.0006	0.020	...
	363	0.0048	0.0009	0.021	...
	370	0.0053	0.0003	0.022	...
	400	0.0052	f	0.021	...
	423	0.0058	0.0003	0.024	...
	439	0.0052	0.0003	0.022	...
	473	0.0050	0.0001	0.022	...
	480	0.0052	0.0003	0.020	...
	493	0.0052	0.0008	0.022	...
B	387	0.0008	...	0.073	...
	388	0.0008	...	0.078	...
	436	0.0005	0.0003	0.092	0.0008
	437	0.0007	0.0002	0.105	0.0009
	461	0.0009	0.0003	0.086	...
	462	0.0008	0.0002	0.105	...
	470	0.0005	0.0003	0.092	s
	471	0.0005	0.0002	0.091	f
	482	0.0008	...	0.069	mf
	483	0.0007	...	0.087	mf
C	Typical	0.0006	vvf	vvf	0.0021
D	Typical	0.0031	0.0004	0.013	...
E	Typical	0.0011	0.0024	f	0.001
F	Typical	f	0.0004	0.0008	...
G	Typical	...	0.0003	0.0066	...
H	Typical	f	0.0001	0.090	...
I	Typical	0.0007	0.0003	0.081	...
J	Typical	0.0005	f	0.034	0.001
K	Typical	0.0008	f	f	0.001

vvf = very, very faint; f = faint; m = moderate; s = strong, but still too faint for quantitative estimation.

TABLE IV — Preliminary Comparisons of Seven Per Cent

Sample No.	Tin Chemical	Tin Spectrographic	Deviation
4488	0.43	0.38	0.05
4489	0.42	0.44	0.02
4490	0.48	0.46	0.02
4491	0.37	0.35	0.02
4492	0.41	0.42	0.01
4493	0.38	0.35	0.03
4494	0.41	0.32	0.09
4495	0.44	0.50	0.06
4549	0.28	0.28	0.00
4550	0.31	0.25	0.06
4552	0.22	0.19	0.03
4553	0.29	0.25	0.04
4554	0.27	0.28	0.01
4598	0.26	0.26	0.00
4599	0.15	0.14	0.01
4600	0.26	0.27	0.01
4601	0.28	0.28	0.00
4602	0.24	0.25	0.01
4603	0.22	0.22	0.00
4604	0.24	0.23	0.01
4605	0.17	0.14	0.03
4606	0.26	0.26	0.00
4607	0.27	0.26	0.01
4608	0.28	0.31	0.03
4609	0.18	0.22	0.04
4610	0.19	0.20	0.01

Three and One-half Per Cent Antimonial Lead

Sample No.	Tin Chemical	Tin Spectrographic	Deviation
5046	0.37	0.38	0.01
5047	0.24	0.26	0.02
5048	0.27	0.24	0.03
5050	0.26	0.26	0.00
5051	0.28	0.27	0.01
5091	0.14	0.14	0.00
5092	0.21	0.24	0.03

could have been selected, but the one given illustrates fairly well the general magnitude of the discrepancy.

Self-explanatory analytical data are given in Table III.

Speed of Analysis

The speed of spectrographic methods is too well recognized to require amplification here. On one occasion, it was possible, although no particular efforts have been made to develop a rapid method, to analyze in one day 18 pig lead samples quantitatively for Cu, Bi, Cd and Ag and qualitatively for As, Sb, Sn, Ni, Zn and Fe.

Antimonial Lead Analysis

The data of Table IV illustrate preliminary comparisons of chemical and spectrographic analyses of both 3½ and 7 per cent antimonial lead. The spectrographic data were obtained using experimental conditions identical with those adopted for the pig lead program, except that the exposure time was reduced to 1½ min. Chemically analyzed samples rather than synthetically prepared standards were

Chemical and Spectrographic Analyses Antimonial Lead

Arsenic		
Chemical	Spectrographic	Deviation
...	...	...
...	...	...
...	...	...
...	...	...
...	...	...
...	...	...
...	...	...
...	...	...
...	...	...
...	...	...
...	...	...
...	...	...
0.048	0.047	0.001
0.014	0.014	0.000
0.018	0.023	0.005
0.021	0.023	0.002
0.100	0.099	0.001
0.045	0.049	0.004
0.052	0.051	0.001
0.072	0.070	0.002
0.022	0.024	0.002
0.026	0.029	0.003
0.010	0.010	0.000
0.040	0.035	0.005
0.036	0.031	0.005

used in plotting the antimonial lead working curves. Only a relatively small number of antimonial leads have been investigated spectrographically. It is felt that both accuracy and precision will be considerably increased in the future, since each sample subjected to both chemical and spectrographic analysis will add to the reliability of the working curve.

Calcium Lead Analysis

Preliminary investigations carried out with the cooperation of Dr. W. R. Homan, of the Commonwealth Edison Co., have indicated strongly that excitation conditions as adopted for the pig lead program are quite applicable both for the analysis of the calcium and the trace impurities of this alloy.

Acknowledgment

The author finds it impossible to express adequately his appreciation for the help of the individuals and concerns cooperating in this project. He is especially indebted to Professors G. L. Clark and D. T. Englis, of the University of Illinois, and to H. D. Wilson, of the Electric Auto-Lite Co. He is under obligation also to H. M. Wood and R. W. Fitch, of the Prest-O-Lite Storage Battery Corp., to J. L. Lawton, of the USL Battery Corp. and to Professor W. C. Pierce, of the University of Chicago. The research program is being sponsored by the Electric Auto-Lite Co., Toledo, as a cooperative fellowship maintained at the University of Illinois.

Pipes and Fittings of Carbon and Graphite

THE high resistance to corrosion offered by pipe and fittings made of carbon, graphite or Karbate after severe tests, has aroused considerable interest in this comparatively new product, particularly in the stainless steel field.

The materials, made by National Carbon Co., Inc., Cleveland, have high thermal conductivity and are said to be highly resistant to thermal shock. In pickling tanks they have been installed as inlet and outlet pipes and for submerged gas heaters.

Carbon and graphite resist corrosive action of all acids, alkalies and salt solutions except those of a highly oxidizing nature. For example, hydrofluoric acid has no effect on carbon. Graphite is more resistant to oxidation which permits its use under higher temperatures.

Carbon and graphite products as usually manufactured, are slightly porous and thus not entirely impervious to the seepage of liquids and gases under high pressure. The Karbate materials which National Carbon Co. has developed are impervious, however. Karbate No. 1 is a carbon-base material and Karbate No. 2 is a graphite-base product. The latter has better heat conducting properties, and is particularly applicable to heat exchanging operations.

Karbate is light in weight, has low coefficient of thermal expansion, good electrical conductivity, high resistance to thermal shock, and is said to possess greater mechanical strength than corresponding carbon and graphite products. It is attacked only by highly oxidizing agents. Its use is confined to temperatures up to 338 deg. F., but the surface may be exposed to higher temperatures if means are provided to carry off heat from the opposite surface fast enough to keep the body of the material below the critical temperature.

In sulphuric acid pickling solutions for steel, both graphite and Karbate No. 2 pipe are claimed to have shown no evidence of acid attack after six months' immersion.

Graphite rather than Karbate pipe is recommended for nitric acid solutions, where the seepage problem is the lesser evil.

In a nitric and hydrofluoric pickling solution for stainless steel, it is stated that one plant has used graphite pipe for several months without apparent acid attack on the pipe. The Saunders type valve with Karbate body is available, so that complete systems may be assembled. Both threaded type and flanged type fittings are manufactured. On threaded type fittings a thread of uniform diameter is used.

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ADAPTED to many applications where corrosion is a problem, pipe and fittings of carbon, graphite or "Karbate" such as shown here are proving satisfactory under severe service tests.

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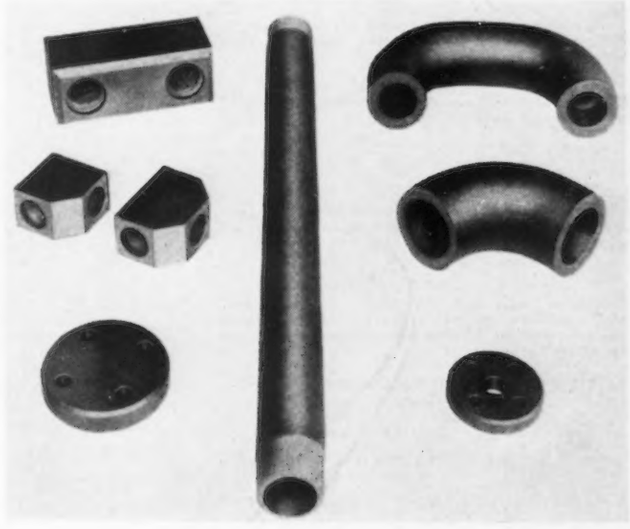

Causes of Gray I

TABLE lists 32 types of defects found in gray iron castings and grades the causes according to degree of probability. Most probable cause indicated (1), second most probable (2), etc. In some instances two causes may be rated with the same degree of probability.

DEFECTS ↓ / CAUSES →	DESIGN	FLASKS	PATTERN EQUIPMENT	MOLD-SETTING AND CLAMPING	GATING
1. Shrinks— (A) Common voids, draws or sponginess present as irregularly shaped cavities, interiors of which are lined with dendritic crystals. Defects generally found near center of heavy sections or near change in section thickness.	Too abrupt change of section size. Lack of fillets. (1)	Low sprue head due to shallow cope flask. (2)	Improperly designed pattern. (4)		Improper Gating. Lack of ample risers. (2)
(B) Common sinks or depressions appearing on cope side of heavy flat castings. Open or closed pipes appearing on cope sides of heavy bosses, lugs or columns, with longest side in vertical section.	Isolated heavy sections. (3)				Improper gating and lack of ample risers. (3)
2. Cracks— (A) Due to internal stresses set up in casting while cooling.	Casting poorly designed, promoting wide variations in cooling rates of the different section thicknesses. (1)				Improperly gated. (5)
(B) Caused by action of external stresses.					
3. Warped—Casting distorted and untrue to pattern. Common in long thin plates, cylinder heads, etc.	Poor design. (2)		Bad design. Too abrupt change of casting thickness. (2)		Improper gating. (1)
4. Hard—Excessive hardness, making machining difficult.					
5. Hard Spots—Small hard areas visible to naked eye and large enough to interfere with machining operations.		Flask bars too close to mold cavity. (4)			Improper gating. (3)
6. Open Grain Structure—Pits on machined surfaces. Fracture shows coarse crystalline structure.					
7. Shifts—Cope, drag or cheek sections of castings do not match at parting line.		Worn pins and bushings. (1)	Cope and drag pattern not matched. (3)	Bad clamping, loose pins and bushings. Rolling weighted molds on gravity conv'rs. (2)	
8. Core Shifts—Movement of core adds thickness to one side of wall of cored area and removes like amount from opposite walls. Also section of casting formed by a core which is improperly located.			Insufficient core prints. (2)		
9. Broken Cores—Defects caused by cores breaking off and moving toward upper surface of casting.			Insufficient Core prints. (3)		
10. Variation in Wall Thickness—Casting section untrue to specifications.			Worn patterns or core boxes. Improperly mounted pattern. (1)		
11. Variations in Length and Width—Length and width of casting varies from pattern dimensions.					
12. Cold Shot—Shot-like particles of metal embedded in wall of casting.					Improper gating. (1)
13. Cold Shut—Metal fails to coalesce or join properly. On casual examination appear as cracks.		Low sprue head. (3)	Worn pattern or core boxes. (5)	Gates clamped off. (4)	Gates too small or incorrectly arranged in relation to thin sections. (3)
14. Misrun—Incompletely filled mold cavity. Also appears as smoothly rounded hole through wall of casting. Especially noticeable at corners and projections.		Low sprue head. (3)			Gates too small. (3)
15. Run Out—Molten metal leaks out of mold.		Warped flasks. Flask too small. Sand or metal on joint of flask. (4)	Bearing surfaces worn or not properly cleaned. (3)	Mold improperly clamped or bedded (1)	Sprue too near side, or runner too near joint of flask. (3)
16. Slag Inclusions—Appear on surface of casting in vicinity of gates or along line of metal flow. Inclusions have a vitrified appearance. removal of inclusions leaves dull black cavity.					Size of gates, sprues and pouring basin not balanced. Gates produce a nozzling effect. (3)

Iron Casting Defects

By W. B. McFERRIN, Foundry Metallurgist
Cadillac Motor Car Division,
General Motors Sales Corp., Detroit

MOLDING	MOLDING SAND	CORES	METAL	MELTING	POURING	SHAKE OUT	OTHER
			In correct composition for section thickness. (1)		Pouring temperature too high or low for method of gating and risering. (3)		
	Molding sand too high in colloidal clay bond. (4)		Combined carbon too high. (1)		Pouring temperature too high for method of gating and composition of metal. (1)		
Hard rammed mold. (2)	Hot strength too high. (2)	Hard cores. (2)	Incorrect metal composition. (3)		Incorrect shake out time. (4)		Improperly heat treated. Rate of heating or cooling too rapid for design. (6)
							Rough handling. (1)
						Incorrect shake out time. (3)	Casting not properly supported when heat treated. (4)
			Carbon and silicon too low. Carbide stabilizing elements too high. (1)			Casting too hot. (2)	Improperly heat treated. (3)
Improper use of chills. (4)	Foreign material in sand. (4)	Core rods or wires exposed. (4)	Carbon and silicon too low. Carbide stabilizing elements too high. (1)	Bad melting or hot metal transfer. (2)	Cold iron. Interrupted pouring. (2)		
			Carbon and silicon too high. Carbide stabilizing elements too low. (1)				Improperly heat treated. (2)
Shift of match plate during roll over. (2)							
Insufficient chaplets. Cores not set correctly. Soft ramming around core print. (1)		Cores incorrectly jigged, gaged or assembled. (3)					
Insufficient chaplets. (1)		Improperly reinforced cores. Bad bonding. Overbaking. Rough handling. (2)					
Excessive pattern rapping. Cores incorrectly set. Uneven mold ram- ming. (2)		Cores not true to core boxes. Cores not properly jigged, gaged or assembled. (3)					
Excessive pattern rapping. (2)			Variations in composition of metal during the heat. (1)				
				Bad melting or hot transfer practice. (2)	Pouring temperature too low for method of gating. Interrupted pouring. (3)		
Hard ramming. Lack of venting. (4)	Moisture too high. Permeability too low. Too much sea coal. (4)		Fluidity too low. (2)	Bad melting or hot transfer practice. (1)	Pouring temperature too low. (2)		
	Moisture too high. Permeability too low. Too much sea coal. (4)		Fluidity too low. (2)	Bad melting or hot transfer practice. (1)	Pouring temperature too low. Interrupted or slow pouring. (1)		
Soft ramming between mold cavity, sprue or runner and flask edge. Core or mold vents not properly protected. (2)						Clamps or weights taken off too soon. Casting too hot. (5)	
	Improperly conditioned. (4)		Metal contains entrapped slag. Dross from ladle addition, alloys, etc., not properly skimmed. (1)	Metal melted too cold to free itself of entrapped slag. Spout or ladle lining of low refractoriness. (3)	Bad pouring and skimming. (1)		

Causes of Gray Iron

DEFECTS ↓ / CAUSES →	DESIGN	FLASKS	PATTERN EQUIPMENT	MOLD-SETTING AND CLAMPING	GATING
17. Sand Inclusions—Cavities of irregular shape and size, inner surface of which shows imprint of a granular material.					Improper gating. (1)
18. Crush—Deformation along parting line or around core prints.			Worn pattern or core box. Core print too small for core. Mismatched cope and drag pattern. (2)	Excessive weighting of mold. Improper clamping or bedding of mold. (3)	
19. Drop—Irregular deformation due to section of mold dropping into mold cavity.		Insufficient bars in flask. Hot flasks. (3)		Rough handling. (2)	
20. Rat or Sticker—Deformation due to portion of mold face sticking in pocket on pattern.			Not enough draft on pattern. Pattern loose on molding machine. Molding machine draws too fast. (3)		
21. Swell—Lump-like deformation due to displacement of sand by molten metal.		Flasks not rigid. Additional bars needed. (3)		Mold not properly clamped or improperly bedded. (2)	
22. Cuts and Washes—Rough lumps of metal or rounded corners which should be sharp. Along line of flow will be found granular depressions or holes.					Improper gating. (3)
23. Metal Penetration—Sand in pockets or internal cores difficult to remove due to penetration of metal into sand, forming a fused mass of metal and sand.					
24. Burning into Sand—Parts of outer surface of casting have rough sandy appearance.					Improper gating. (3)
25. Burning into Core—Rough, sandy appearance of inner part of casting with some sand embedded in the surface. Also appears as fins penetrating into core and holding grains of core sand.					
26. Scab—Rough, slightly raised area, usually on thin walled portion of casting. Usually porous, containing layer of sand beneath surface of rough spot.					Improper gating. (3)
27. Rat Tail—Surface has one or more elongated depressions resembling a rat's tail. Usually found on thin, flat surfaces.					Improper gating. (3)
28. Buckle—Same as rat tails, except that mold surface has expanded to a greater extent, producing deeper depressions. Occurs usually in heavy, flat castings.					Improper gating. (3)
29. Blister—Raised gas pocket or envelope on casting surface.					
30. Sand Blow—Unusually smooth depression on outer surface of casting, or rounded or oblong holes through wall of casting. Also appears as large gas holes on cope side and in heavy sections above improperly vented pocket.		Lack of vent holes in flasks or bottom boards. (4)			Sprue head too low. (3)
31. Core Blow—Unusually smooth depression on inner surface of casting, or gas hole in wall above cored cavity.			Insufficient venting. (4)		Sprue head too low. (2)
32. Chill or Chaplet Blow—Large, rounded cavity, gas pocket or small gas holes on or under surface of casting in vicinity of chill or chaplet.					

Casting Defects—*Continued*

MOLDING	MOLDING SAND	CORES	METAL	MELTING	POURING	SHAKE OUT	OTHER
Sloppy molding practice. (1)	Improperly conditioned. Dry strength and permeability probably too low. (2)	Dirty or poorly cleaned cores. (3)					
Faulty closing of mold. (1)	Green strength too low. (4)						
Soft ramming. Rough handling. Insufficient gaggers. (2)	Moisture and green strength probably too low. (1)						
Low or high mold hardness. (2)	Green strength too low. (1)						
Soft ramming. (1)							
Soft ramming. (2)	Incorrect moisture content. Dry strength too low Not enough sea coal. (1)	Over-baked or poorly bonded. (4)					
Soft ramming. Mold or cores improperly coated. (1)	Sand too coarse. Flowability too low. Not enough sea coal. (2)	Sand too coarse. Cores overbaked or improperly coated. (1)			Pouring temperature too high. (3)		
Soft ramming. Mold incorrectly sprayed or coated. (2)	Incorrect moisture content. Permeability too high. Not enough sea coal. (1)				Pouring temperture too high. (3)		
		Cores over-baked or baked too rapidly. Improperly coated. Poorly bonded. Not enough sea-coal, cereal or clay bond in sand. (1)			Pouring temperature too high. (2)		
Hard ramming. (2)	Low permeability. Moisture too high. Not enough sea coal. (1)				Pouring temperature too high. (3)		
Hard ramming. (2)	Expansion of sand caused by high moisture content, low permeability, not enough sea coal. (1)				Pouring temperature too high. (3)		
Hard ramming. (2)	Expansion of sand caused by low permeability, too much moisture, not enough sea coal. (1)				Pouring temperature too high. (3)		
Hard ramming. (2)	Low permeability. High moisture content. (1)	Coated or sprayed surface of core or mold improperly dried. (3)					
Hard ramming. Pockets not properly vented. Wrong type mold spray. (1)	Too much moisture. Permeability too low. Sea coal or organic material content too high. (1)				Iron cold or sluggish. (2)		
Core vents not properly protected. (3)		Insufficient bak-Moisture picked up after baking. Cores incorrectly bonded, vented or coated. (1)			Iron cold or sluggish. (2)		
Rusty or wet chills or chaplets. (1)	Sand too hot. (2)	Failure to vent chills when used as part of core. (3)					

Steel Gear Blanks Cut with Carbides

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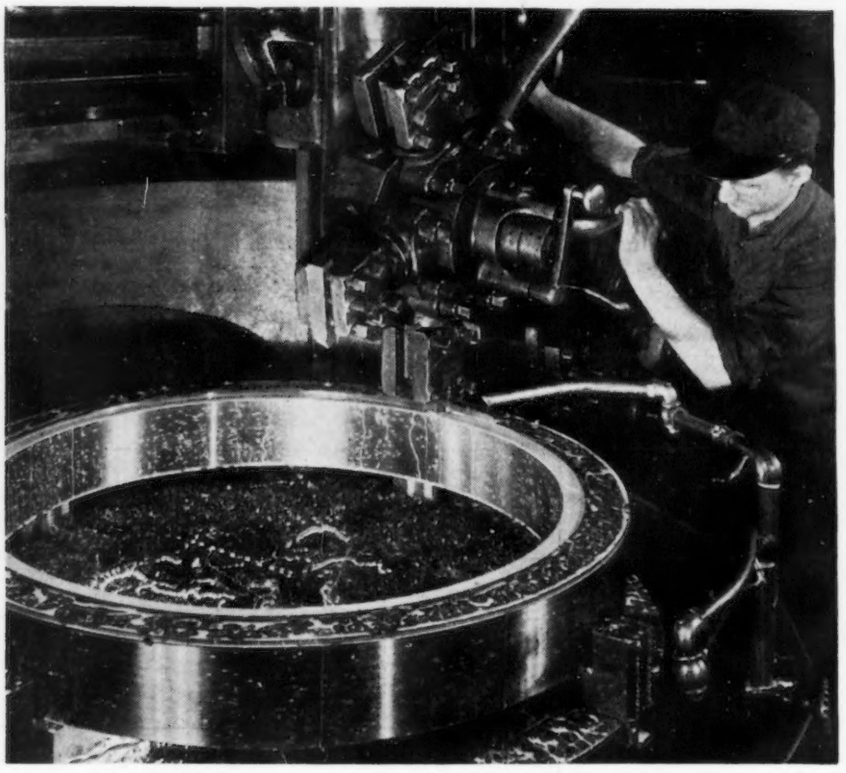

AN extensive experimental program with cemented carbide tools in the turning of steel gear blanks has been carried on at the Nuttall works of the Westinghouse Gearing Division at Pittsburgh, one of the largest industrial gearing plants in the United States. The obvious incentives for development of carbide turning tools are increased production and greater accuracy, the latter because carbide cutting edges wear less than tool steels and produce more uniform diameters without resetting production machinery. A series of case studies at the Nuttall works indicates that from the production point of view, the reduction in tooling costs may be a stronger reason than any other for using carbide tools, since quality with any tooling can always be preserved through establishment of proper limits.

A typical example is a ring gear, made of 0.40 to 0.50 carbon steel, heat treated to a Brinell hardness of 350, from which 218 cu. in. of metal is removed in turning in a vertical boring mill. Cutting speed during the studies was 180 ft. per min. at a feed of 0.018 in. per rev. Carbide tools were used for turning both outside and inside diameters, as well as the face of the gear. Finish of the turned surfaces was smooth enough to be acceptable under the close tolerances established, and the bore was accurate enough to obviate the usual grinding to remove paper. On a comparable basis the costs of turning this gear with carbide and high-speed tools breaks down as indicated in the table.

On this gear, then, the use of carbide tools instead of high-speed steel saved $3.89, or 51 per cent. Similar savings for carbide tools were discovered in four other case studies:

		High-Speed Steel	Carbide
Average number rings per tool grind		½	5
Cu. in. metal removed for each tool grind		109	1,090
Number of grinds per tool		30	17
Number of rings per tool		15	85
Average cost per tool		$8.00	$24.00
Hours allowed per ring	Turning	4.90	3.53
	Grinding bore	2.70	...
Tool cost per ring		$1.06	$0.53
Tool grinding cost per ring		2.32	0.10
Labor cost per ring		4.20	3.03
Total cost per ring		$7.58	$3.69

Kind of Piece	Material	Turning Speed, ft. per min.	Feed, In. per Rev.	Percentage Saving With Carbide
Shaft	Untreated forged steel, Brinell 190	350	0.020	50
Shaft, 6¾ in. diameter, 51 in. long	Heat-treated 0.40-0.50 carbon steel, Brinell 269-285	280	0.020	47
	Untreated 0.30-0.40 carbon cast steel, Brinell 180	240	0.018	12.5
	Same gear, heat-treated before turning; Brinell 302	180	0.018	41

In these tabulations tool grinding costs for high-speed steels are included in the number of hours allowed per shaft, since the lathe operator dresses his own tools. For carbide tools the grinding cost is allocated separately because tool dressing is performed in the tool room.

Rebuilding Worn Cast Iron Surfaces

This worn cam is being rebuilt with cast iron for the seventh time.

IN the rebuilding of gray cast iron parts, soft, machinable welds are readily obtainable by careful procedure and attention to detail, according to a recent article in *Oxy-Acetylene Tips*. Hard spots within the rebuilt areas must be avoided. This, of course, means that the operator must weld carefully and take into consideration a number of factors which, if not properly controlled, will result in an unsatisfactory deposit of cast iron over the rebuilt area.

Hard welds or hard spots are caused by the presence of small pieces of oxide, by cooling of the weld puddle due to sudden immersion of the cold welding rod, or by careless manipulation of the blowpipe which allows portions of the weld to solidify suddenly. Proper preheating of both rod and casting helps to avoid chilling. In addition, chilling is prevented by thoroughly protecting the part from drafts both during welding and subsequent cooling.

The rebuilding of cams and roller trippers for a button drilling machine, is typical of countless similar rebuilding operations where a cast iron deposit, which is readily machinable, yet hard enough to have good wearing properties, is desired. Due to the abrasive action of dust resulting from the drilling operations, these parts usually wear out in about a year. Rebuilding of the cams becomes necessary when wear extends ⅛ in. below original contacting surfaces. Roller trippers are permitted to wear as much as ¼ in. before they are reclaimed by welding.

The first step in the cast iron rebuilding operation is the careful cleaning of the areas which are to be rebuilt. Small parts are usually ground, or chipped to clean metal with a hammer and cold chisel. Heavy sections may be prepared with the cutting blowpipe or pneumatic chipping hammer. Any traces of scale, cutting slag, rust, grease or dirt which then remain are removed by emery wheel, sand blast or wire brush. Since impurities will cause porous spots and blowholes in the weld, cleaning must be thorough and should extend sufficiently beyond the edges of the area which is to be rebuilt so that undesirable materials will not be carried over into the molten puddle during welding.

When the gray iron part is thoroughly cleaned, it is set in position so that the welding can be done in a horizontal plane, and the entire casting is heated under the blowpipe flame to a dull red. For the small cams and roller trippers shown, the operator may use an Oxweld W-17 blowpipe equipped with a No. 4 tip; large castings usually require the use of a preheating furnace. The neutral flame is then directed over the area which is to be rebuilt. As the base metal begins to melt, a surface skin of oxide is formed which must be broken in order to obtain proper fusion. This is acomplished by stirring the molten puddle with the end of the 3/16-in. or ¼-in. diameter Oxweld No. 9 cast iron welding rod, and by using Oxweld Ferro flux.

Also to assure thorough fusion, the operator welds slowly, applying only sufficient heat to make the cast iron flow readily. Rapid welding and overheating of the metal are avoided because both these factors tend to increase the amount of undesirable gas bubbles and oxide inclusions in the weld. All included pieces of oxide, which appear in the molten metal as white specks or brightly glowing globules about the size of a pinhead, are carefully and systematically worked to the surface and then to the edge of the puddle with the blowpipe flame, but the tip of the inner cone is at no time allowed to touch the surface of the puddle. They are then skimmed out with the fluxed end of the welding rod. When all oxide inclusions have been removed and the puddle surface appears clean, weld metal is added to build up the surface. The end of the rod is heated in the outer edge of the flame, dipped into the flux, and then melted in the puddle. Chilling of the metal, which results in undesirable hardness, is avoided by heating the rod to a temperature just below its melting point before introducing it into the puddle.

When the part has been rebuilt to size, the surface is reheated slightly to smooth it out. Any impurities which appear during this operation are removed as previously described. Then the part is carefully protected from drafts with a covering of asbestos paper and allowed to cool slowly. To test the rebuilt area for machinability, the operator uses an ordinary file. If the deposited metal files easily, it indicates that the job has been done properly.

Trends in Foundry

THE primary aim of current foundry research is to provide stricter control over the characteristics of castings, without sacrificing quantity output. Changes in the design and operation of foundry equipment over the past year have generally reflected this aim. In the accompanying summary of recent improvements and changes in equipment and descriptions of new models, culled from manufacturers' announcements, will be found many suggestions for meeting the qualitative demands for casting users on a production basis.

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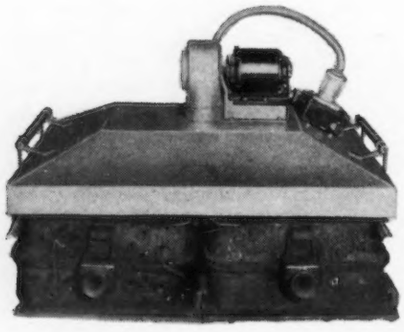
ELIMINATION of casting loss to buckling and scabs and reduction in grinding operations are advantages claimed for new patented electric mold skin drier developed by *Modern Equipment Co.*, Port Washington, Wis. Drier is made in seven standard sizes ranging from 26 x 26 in. to 30 x 72 in. and requires from 15 to 30 min. to develop a hard surface, depending upon the depth of the pocket in the mold and thickness of the baked surface needed. A fan mounted above heating element circulates heat throughout the mold. Unit can be used as a portable drier or, on conveyor lines, erected above the conveyor to dry the molds as they pass beneath.

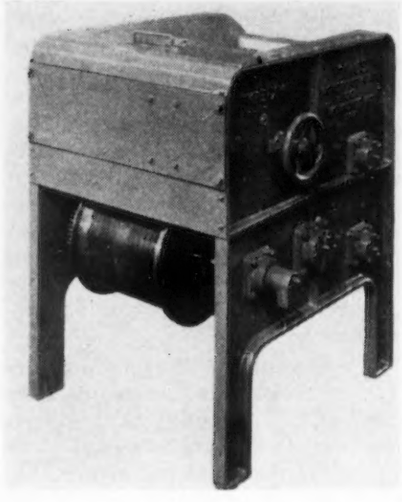


Core Wetting Material

SMOOTH cores for non-ferrous castings can be easily obtained, it is claimed, by addition of small percentage of Sulfatate, a new type wetting agent, available from *Glyco Products Co., Inc.*, 148 Lafayette Street, New York. The recommended procedure is to dip the core, after baking, into a solution of 1 pt. of molasses, 10 lb. of graphite, 1 lb. of Sulfatate and sufficient water to make 5 gal. After re-baking, the core will have a smooth surface which will require little, if any machining. Addition of Sulfatate eliminates necessity of hanging the core so that excess graphite-molasses mixture will drip off.

Magnetic Separators

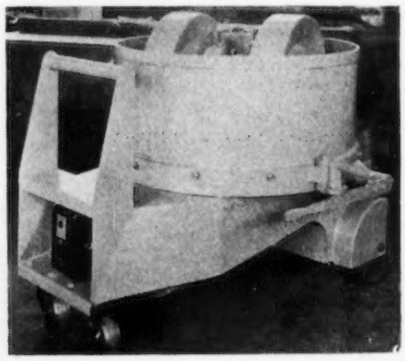
NO conveyor belt is required in the new high intensity type XM magnetic separator developed by *Dings Magnetic Separator Co.*, Milwaukee, for brass foundry and steel industry use. Shell of drum in separator is stainless steel, which is nonmagnetic and resistant to wear. This feature is said to be especially advantageous when used in steel foundries to separate shot from sand and in brass foundries to separate brass and steel borings. Windings are of glass covered wire, allowing very hot material to be separated without injuring the electrical coils.



The *Dings* Ball-Norton belt-type separator has been redesigned to give a more rugged and powerful unit. Special pick-up coils have been incorporated in the machine which are said to improve separating qualities and capacities. Calibrated rheostat adjustments are furnished so that operators may vary intensity of separation through wide range for separation of such materials as babbitt, zinc, cadmium, etc., from steel and cast iron borings.

Portable Sand Mixer

A PORTABLE intensive sand mixer, having a capacity of 150 to 200 lb. of sand per batch, has been developed by *National Engineering Co.*, Chicago. Designated as model O, unit is self-contained, motor-driven, and equipped so that it may be pushed on the floor or picked up by crane. Mixing time averages from 2 to 4 min., depending upon type of sand being prepared. The portable feature is also available in model No. 1. This model has a 4-ft. pan and capacity of 400 lb. per batch.



Soy Bean Core Oil

CORE oil with soy bean oil base is being offered by *Velsicol Corp.*, Chicago. Advantages noted for this oil, called Soyol, is that it works freely in core boxes without sticking; that it bakes as quickly as other type bind-

Equipment

By FRANK J. OLIVER
Associate Editor, The Iron Age

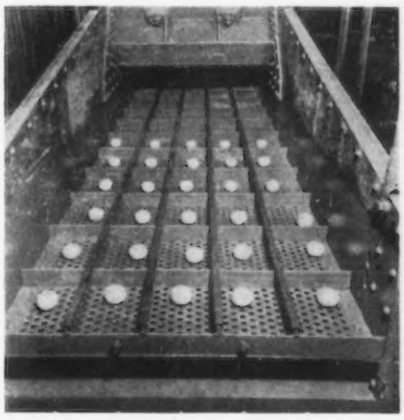
ers and will stand more over-baking, and that it does not deteriorate the molding sand.

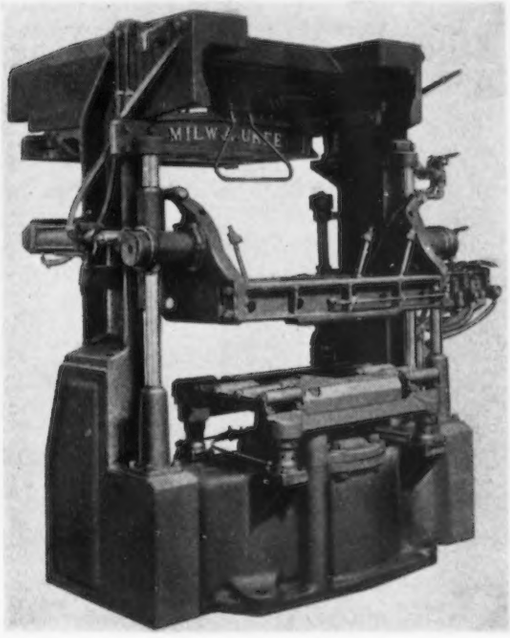
Molding Machine

A SIMPLIFIED and more direct operating cycle, which shortens molding time, is a feature of new jolt squeeze rollover pattern draw molding machine introduced recently by *Milwaukee Foundry Equipment Co.*, Milwaukee. Machine functions exactly like a jolt squeezing stripper through squeezing operation, at which time pattern table is dogged in a rollover position instead of in the pattern drawing position. Pattern table rests directly on the jolt table during jolting action with the full force of jolting blows transmitted directly to base of the machine. Squeezing is against a manually operated car-type squeeze platen, the use of squeeze peens eliminating bottom boards. As mold recedes from squeeze peens, pattern table is automatically dogged in rollover position by separate air operated lifting mechanism that directly engages trunnion bearings. Fast rollover action is provided by two air driven piston rods against the cranks attached to the rollover trunnions. Leveling is accomplished by a newly designed electrically controlled air-hydraulic mechanism supporting the roller conveyor section. Flask clamping is done automatically.

Vibrating Screen

A NEW low-head vibrating unit, which permits screening tempered sand on smaller openings, has been developed by *Allis-Chalmers Mfg. Co.*, Milwaukee. This machine, called the Sta-Clean screen, features a subdeck, located below the wire cloth, divided into compartments. Each compartment contains a special rubber ball which is caused to bounce against the screen cloth by the vibrating motion of the unit, setting up a secondary vibration which prevents blinding screen openings. This feature permits handling of moist materials without difficulty. Accompanying photograph illustrates this unit with screen cloth removed to show ball compartments.





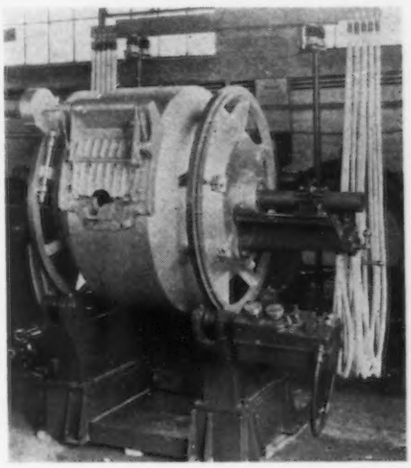
Mold Conveyor

AN improved design of car type mold conveyor for foundry use has been developed by *Link-Belt Co.*, Chicago. Tray tops are made continuous by means of a lap plate and each tray is supported on four straight-faced carrying rollers fitted with anti-friction ball or roller bearings. A feature of this conveyor is its ability to negotiate a curve or series of curves in either direction with the conveyor line. In passing around curves the carrying rollers are guided in a true radial path, eliminating side slippage, track and roller wear.

Conical Shell Electric Furnace

GREATER depth of metal under and near the arc, making for more efficient heat transfer, lower refractory maintenance costs and elimination of cool end zones are among advantages claimed for the conical shell type electric rocking furnace developed by *Detroit Electric Furnace Division, Kuhlman Electric Co.*, Bay City, Mich. Compared with the straight type, the conical design is claimed to require less power per ton and to give faster melting.

Both the new conical and other type electric furnaces produced by the company now feature a new sliding contact cable connector which reduces



cable replacement costs. These connectors can also be applied to existing installations. An automatic rocking controller is another recent improvement in the *Detroit* furnaces. This controller enables operator to set the initial rock at any desired angle, to continue rocking through that angle for any desired number of minutes and then to progressively increase the angle of rock from its initial setting to full rock in any chosen interval. *Detroit* furnaces are also equipped with magnetic brake type rocking motors. A failure in the motor circuit causes brake to apply and stops the rocking motor.

Cupola Blowers

A NEW inlet vane control, for use in place of a butterfly valve, is now available for use on the Whiting Allis-Chalmers cupola blowers made by *Whiting Corp.* With this control the power consumption will vary with both weight of air and wind box pressure, while with the butterfly control the power consumption is said to vary only with weight of air.

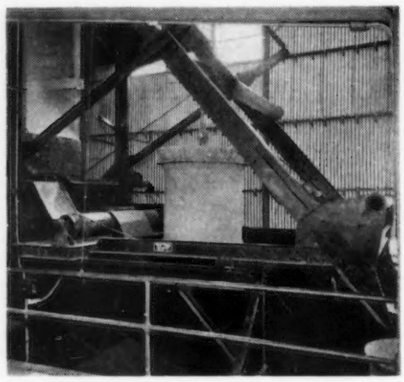
Production Rollover Machine

AN automatic electric timer which eliminates necessity of counting number of jarrs given a mold and which assures every mold being rammed to its proper density is now standard equipment on series No. 750 and No. 1500, high speed jarr rollover and pattern drawing molding machines offered by *Herman Pneumatic Machine Co.,* Pittsburgh. Timers are accurate to within a fraction of a second and may be used on any jarring machine. These machines are also equipped with air clamps by which any size or depth mold, within capacity of machine, may instantly be clamped or unclamped by operator without leaving operating valve. Machines have capacities of 750 and 1500 lb. respectively.

A number of improvements have also been made in the *Herman* jarr squeeze equipment, including practically all cast steel construction, patented balanced squeeze head and extra long cylinder and plunger. These units can be equipped with the strip feature if desired.

Inclined Skip Charger

AN inclined skip hoist cupola charger, combining the advantages of the wishbone principle and the skip hoist design, has been developed by *Whiting Corp.,* Harvey, Ill. This type charger is said to be less expensive than the crane type, but retains all the advantages of the wishbone type in that cone-bottom buckets are placed on a wishbone-shaped casting at the charging door and when bucket bottom is lowered, the iron and coke are evenly distributed.



Spark Collector

A SPARK collector and gas washer for cupola stacks, which captures 95 per cent of the solids going up the stack, has been designed by *Whiting Corp.,* Harvey, Ill. All smoke and gaseous matter going up the stack must pass through three separate curtains of water. The small amount of smoke that comes from the stack is light in color and cleansed of obnoxious fumes, a condition important to foundries in residential neighborhoods. At no time can flame escape through top of stack. No blowers are required and in most cases city water pressure is sufficient for washing requirements.

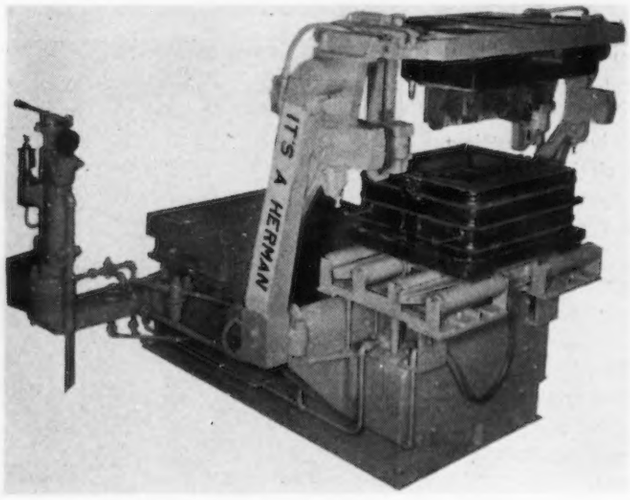
Jointing Refractory

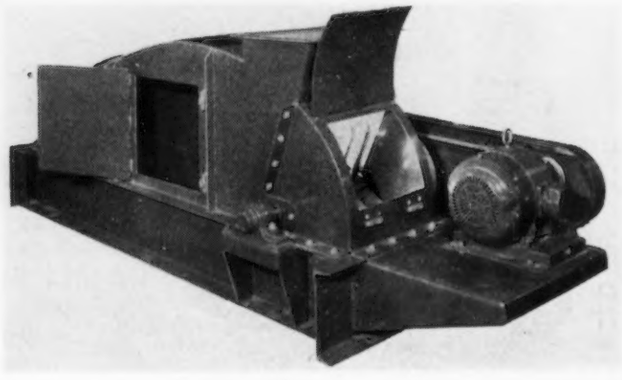
DEVELOPMENT of Metalite, a new refractory jointing material for fire clay brick, has been announced by *Laclede-Christy Clay Products Co.,* St. Louis. Metalite has a pyrometric cone equivalent of cone 36 (3290 deg. F.) and can be used for dipping or trowelling in laying fire brick. It can also be sprayed or brushed on as a protective coating or it can be used for filling cracks. Material is low in silica, resistant to slags containing molten metal oxides and contains no air-setting ingredients.

Sand Revivifier

ABILITY to economically and effectively disintegrate and cool molding sand to produce a sand that will ram to even, uniform density in the mold is claimed for the revivifier introduced by *Link-Belt Co.,* Chicago. Unit is made in four sizes for maximum capacities of from 25 to 150 tons per hr., and is a self-contained unit. Large hinged doors provide easy access and cleanout.

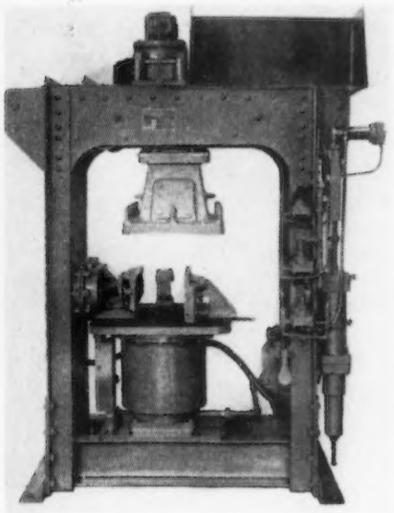
Hexagonal revolving screen units (not illustrated), with complete dust enclosures, are offered by *Link-Belt* for continuous systems. Sizes run from 4 to 8 ft. long for capacities of 10 to 125 tons per hr. Screen drive is self-contained with the enclosure.





Core Blowing Machines

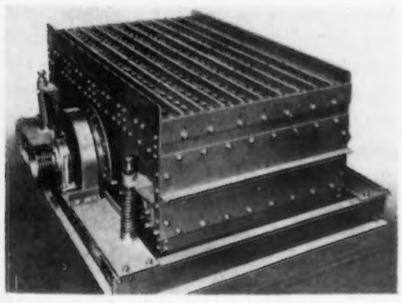
WM. DEMMLER & BROS., Kewanee, Ill., is offering a model 3E core blowing machine, suitable for blowing automobile head and manifold cores, featuring a long draw cylinder which permits the top half of the core box to be attached to the blow plate and the core drawn on the machine. An accurate draw is insured



by a long center guide. Draw is hydraulically controlled for smooth operation. A model 0 machine, designed primarily for small core work such as brass plumbing goods, has also been introduced. This model features few wearing parts and simplicity of operation.

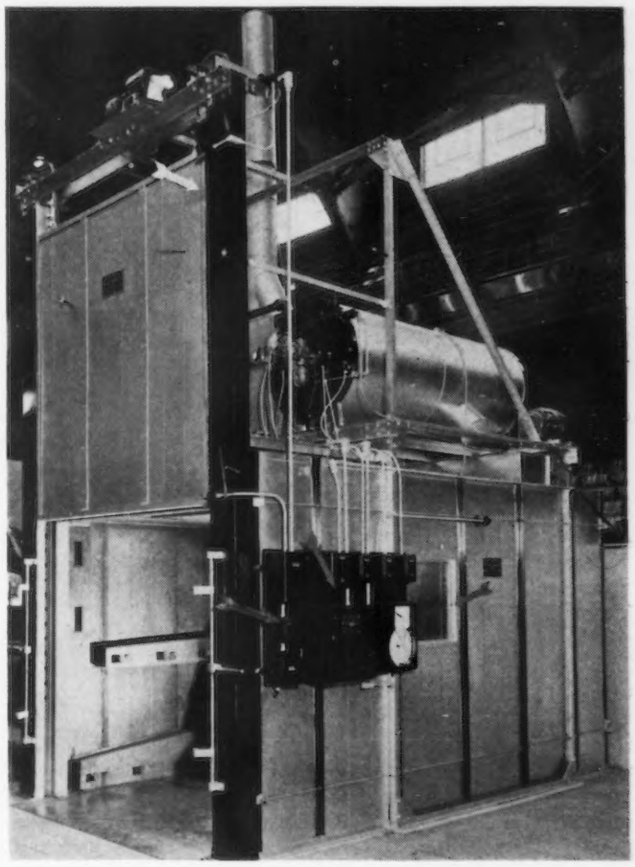
Shakeout Screens

REFINEMENTS in the design of shakeout screens offered by *Allis-Chalmers Mfg. Co.*, Chicago, include the use of corner coil springs to carry the weight of the body of the screen and other moving parts. This relieves outer bearings of the duty of carrying this weight and these bearings now act as centering bearings only. Shakeout mechanism is completely sealed against dust. Water-cooled eccentric bearings are available.



Core Ovens

TWO new features, designed to reduce waste of fuel, of the core ovens manufactured by *Paul Maehler Co.*, 2200 West Lake Street, Chicago, are automatic door switches and safety spring latches. Function of the door switch is to cut the burner to a low flame when doors are opened for reloading or inspection. The safety spring latches conserve heat by holding the door firmly against the jamb when closed, but are constructed to blow open in case of sudden compression inside the oven. Another recent improvement is the adoption of an automatic lift door. Door is counterweighted and requires only a small motor to operate. Automatic control of baking time by use of an electrically operated timing device is now available on *Maehler* ovens. Timing device does not go into operation until baking temperature is reached and automatically shuts off heater at end of selected baking time. More efficient exhausting of gases is obtained in these ovens by using the door columns as exhaust ports, and connecting the ports to a power exhaust fan.



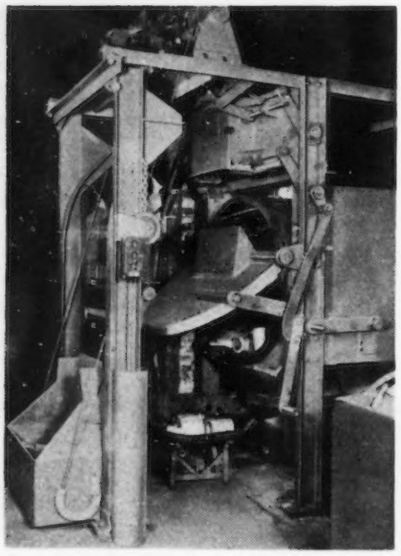
A combination gas and oil burner for foundries undecided as to which fuel they desire to use permanently, or which may want to change from one to the other after the equipment is installed, is also being offered by *Maehler*.

Motorized Nose Furnace

CONSTRUCTED to give a constant pouring arc, thus eliminating the need for manipulating the ladle or mold to accommodate variance of furnace tilt, the new motorized nose pouring furnace for melting brass, aluminum, nickel, iron and rare metals introduced by *Fisher Furnace Co.*, 1740 North Kolmar Avenue, Chicago, is especially well adapted for continuous pouring applications. The constant pouring arc is obtained by bringing the pouring lip to the center of pivot by mounting the furnace of trunnions axised in line with the lip. Capacities available run from No. 150 to No. 400 crucibles, with standard tilting speeds of 90 deg. a min. Oil or gas may be used. All controls are centered at one point and use of safety stops prevents operator from running furnace tilt beyond the two maximum extremes of the tilting range.

Hydro-Blast Barrel

A DUSTLESS cleaning unit, combining the features of a tumbling barrel and hydraulic blasting, for gray iron, brass and steel foundries has been developed by *Whiting Corp.*, Harvey, Ill. Use of this machine, called a Hydro-Blast barrel, eliminates core knock-out, as cores are quickly and effectively removed during the cleaning operation. In addition to being completely dustless, unit is said to reduce machining time by virtue of the fact that the scouring action of the sand and water stream leaves the casting surface exceptionally clean. Loading of the barrel is accomplished automatically by electrically operated loader.



Blasting period ranges from 5 to 10 min. and ordinary foundry sand is used in the blasting operation. Unloading is accomplished automatically by reversing the direction of rotation. Means are also provided for use of an inhibitor to prevent rusting.

Continuous Automatic Cleaning

CONTINUOUS automatic cleaning for large production shops is available in the new Wheelabrator Tum-Blast developed by *American Foundry Equipment Co.,* Mishawaka, Ind. These units combine tumbling and blasting by the Wheelabrator method and are said to have productive capacity in excess of any barrel type blast equipment offered. A conveyor system can be used to load the unit and tumbling speed and flow of work through the unit can be easily varied. No compressed air is required.

JOBBING shops having varied production which requires both a tumbling machine and a table type machine will be interested in the combination Tumblast-Tablast airless Wheelabrator (not illustrated) announced by *American Foundry Equipment Co.* This unit is made up of a 6 ft. plain Tablast and a 27x36 in. Tum-Blast. Barrel capacity is 5 cu. ft.

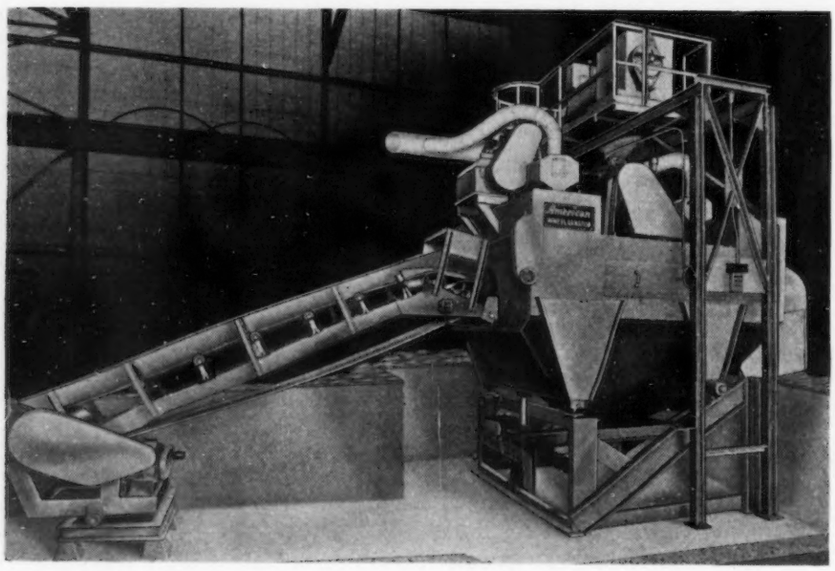
Cylindrical Exhausting Unit

A COMPACT, self-contained, cylindrical unit for collecting the exhaust from polishing, buffing, grinding wheels, etc., and for cases where equipment is isolated from large collecting systems, is being offered by *Industrial Equipment Division, Continental Roll & Foundry Co.,* East Chicago, Ind. These units occupy less than 4 cu. ft. of space and have a capacity of 450 cu. ft. per min. Exhaust is drawn into unit by means of specially designed vertical fan and is introduced into a spiral plenum chamber for precipitation. Cleaned air leaves unit through an easily replaced filter. Collected matter is removed periodically by loosening two wing nuts and sliding out a tray. Due to its small size and light weight it can be installed on floor at rear of machine, suspended overhead or in any other convenient place.

Wet Disposal Units

A WET disposal unit, designed for wetting and mixing with water or other liquids the collected dust discharged from hoppers of cloth filter or other dry types of dust collectors, has been introduced by *American Foundry Equipment Co.,* Mishawaka, Ind. Use of this unit prevents the dispersal of dust into the atmosphere when emptying dry collectors. The mixing of the dust from the collector and the water, which enters through the disposal unit, is constantly under control of operator. In multiple hopper installations, unit can be mounted on track below collector discharges with one unit serving a number of collectors.

THE same company is also marketing a high efficiency long cone cyclone type dry collector. Dust is separated from the air stream by centrifugal force in these units and efficiency is said to be within a small percentage of filter type. Proportioning of unit results in high efficiencies with relatively low back pressure.

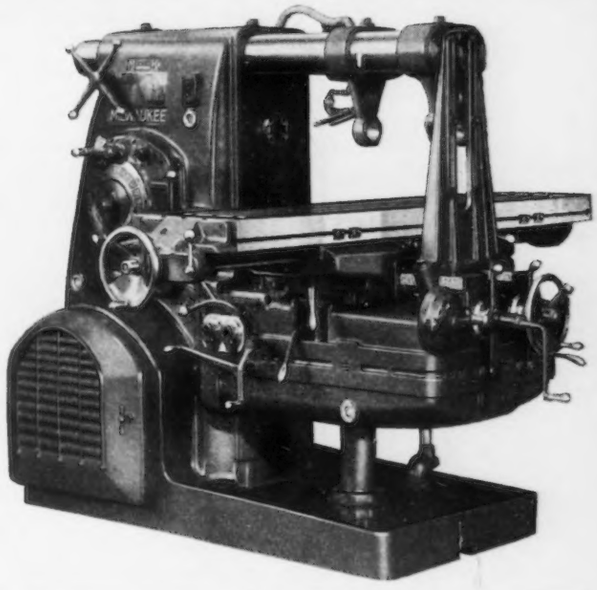


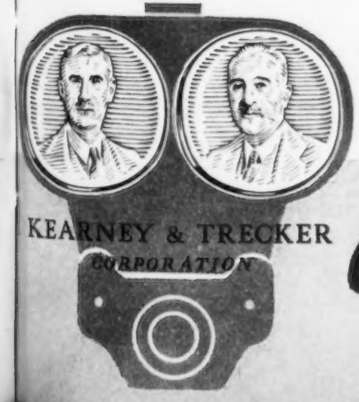
Sly Introduces Two Units

W. W. SLY MFG. CO., Cleveland, has also introduced new airless blast cleaners—a Centri-Blast Rotary Mill for cleaning rugged castings and a Centri-Blast Rotary Table for cleaning, flat, intricate and delicate castings. Initial velocity of the abrasive as it is fed into the blasting wheel is produced by a small blower, which distributes it uniformly over the blast wheel blades. The final centrifugal velocity of the blast is created by the blast wheel. This feeding arrangement is said to eliminate all wearing parts at the feed point. Other features include special alloy wear plates on rotor, housing liners and other parts cast sectionally for quick and economical replacement. Blades can be changed by loosening two screws.

A LARGE staff of highly trained technical men — constantly checking, testing, and gauging at every stage of construction and assembly — make sure that every part — every unit — measures up to Milwaukee standards of milling machine quality and accuracy.

KEARNEY & TRECKER CORPORATION
MILWAUKEE, WISCONSIN





Milwaukee MILLING MACHINES

On The Assembly Line

BY W. F. SHERMAN
Detroit Editor

• New Nash "6" shown to editors after three years of secrecy and rumor . . . Studebaker plans initial production rate of 15,000 cars monthly . . . Defense requirements make tooling up for 1942 a difficult problem

DETROIT—A new six-cylinder Nash car, designed and tested in the secrecy of an unobtrusive looking brick garage on a side street in a small midwestern town, will make its appearance about Oct. 1 after three years of secrecy and rumor. The first production model, or at least a hand-built version of it, was shown to automotive editors recently at the Nash preview. The car has been designated the Ambassador 600, according to George W. Mason, president of Nash-Kelvinator Corp.

First reaction to the Nash 600 is that it is a big car with full-sized body and 194 in. overall length. Body and frame construction, as stated previously in THE IRON AGE, is a radical departure from current practice in the low-priced field which Nash is invading. The car, it is stated, will sell in the Ford-Chevrolet-Plymouth price range.

Almost as surprising as the car itself is the projected production schedule for Nash in 1941. The sales goal for this Nash and the Six and Eight has been set at 125,000 units, nearly double the 62,000 cars sold in the 1940 model year.

Refrigerator Formula To Be Tried

SALES quotas are frequently taken with a grain of salt, but the saline antidote may not be so necessary in this instance, observers agree. Essentially, Nash during the forthcoming year will attempt to duplicate the program which the refrigerator division of Nash-Kelvinator Corp. succeeded in putting across during the last year. Ingredients in the formula are "standardization," "concentration on mass market product," "price reduction," "highly efficient tooling," and a measure of daring to invade competitors' fields unexpectedly. The result, only anticipated in the case of the Nash car, but already realized in the case of the refrigerator, is a doubling or tripling of sales.

Mason put the formula to work for Kelvinator Division at the start of this year. Production of refrigerators was concentrated on the six cubic foot size cabinet, representative of 96 per cent of sales. Production was accelerated even before sales slips began to roll in to the Nash-Kelvinator offices here. Output, which was only 115,000 units a year ago, was paced for a 220,000-unit year. Prices were slashed, with the six-cubic-foot-size offered at practically the price of a four cubic foot refrigerator. Results have already exceeded anticipated volume and the year is expected to close with a record of 320,000 refrigerator sales, a 278 per cent increase in one year.

In all essentials, Mason's plan for Nash is a parallel except that he is tackling very powerful opponents in the Big Three. He pointed out that the Big Three today cover 57 per cent of the automotive market; the cars in the present Nash Six and Eight price class represent 35 per cent of the market—by adding the 600 model, Nash will be selling in 92 per cent of the automotive market. It is on this basis that the 1941 goal of 125,000 cars has been set. Mason, in agreement with other authorities in the automotive industry, expects the industry's sales of 1941 models to be at least 10 per cent above those of the 1940 model year.

Tooling up for the 600 model has meant an expenditure of $7,000,000 in Nash plants. Changes have been made in both the Kenosha factories and the body plant at Milwaukee.

The car will have the torpedo-type body with full three-passenger seats, nearly five feet wide. It will be powered with a motor of simplified design which follows the Nash practice of having manifolds cast in the engine block. The engine will have six cylinders and will develop 75 hp. Company officials have confirmed rumors concerning the engine's economy, stating that the car has done better than 30 miles on a gallon of fuel on road tests, but that Nash will advertise a more conservative figure of "between 25 and 30 miles to a gallon."

A suspension system never seen before on an American automobile will be one of the outstanding features of the car.

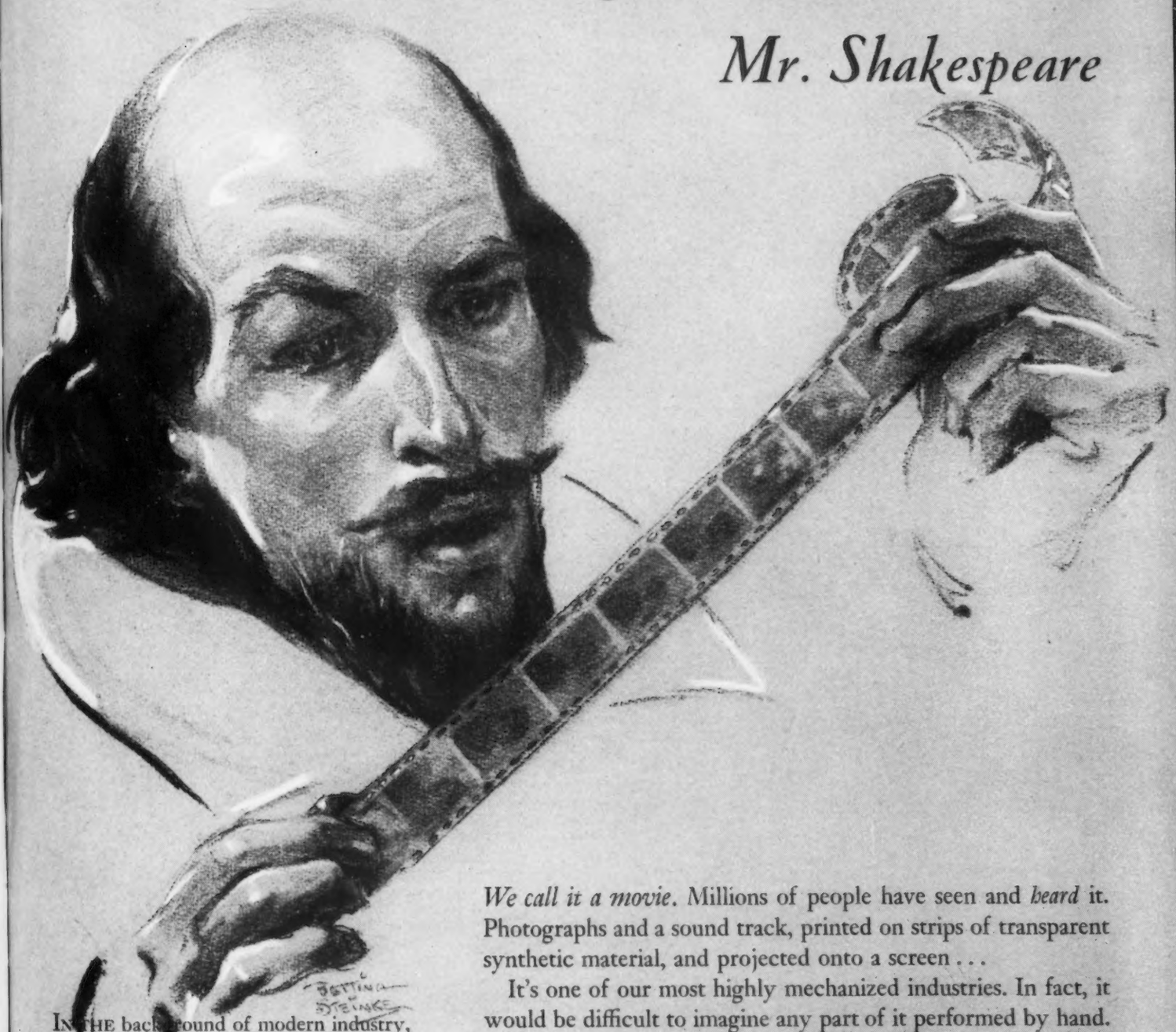
Independents to Tackle Big "3"

MAKING an unexpected appearance at the preview was one of the industry's real pioneers, C. W. Nash himself, who still plays a role in the company which bears his name. Mr. Nash, three-quarters of a century old, was surprising in his vigor and enthusiasm. He recalled the peak days for Nash when yearly output was 137,000 cars and business volume was $137,000,000.

This looks like the year in which the independents in the automobile industry will make a mass attack on the Big Three. Willys-Overland, under the leadership of Joseph W. Frazer, president, has planned a new car which will be sold under a new name which will be announced October 1. Frazer, a Chrysler executive who joined Willys in January, 1939, has already seen Willys increase its sales total from 15,500 cars in 1939 to 32,443 cars of the 1940 vintage. This company, which once sold 300,000 cars a season, is going at the job of regaining its position with Theodore F. McManus, noted advertising man, as counselor for 1941.

It's the Midsummer Night's Dream . . .

Mr. Shakespeare



We call it a movie. Millions of people have seen and *heard* it. Photographs and a sound track, printed on strips of transparent synthetic material, and projected onto a screen . . .

It's one of our most highly mechanized industries. In fact, it would be difficult to imagine any part of it performed by hand. The cameras, microphones, lights, sound effects, with their delicate controls are all machines. The very film is made by machinery. And back of these are other machines that cut and drill and shape and grind to produce parts and tools which could not be made by hand.

Cameras and projectors are run at high speed—24 frames a second. That requires *accuracy* starting far in the background with the machines that make machines—precise to the tenth of a thousandth.

You're right, Mr. Shakespeare—we do owe a lot to the modern machine.

IN THE background of modern industry, you will find Pratt & Whitney machine tools, small tools and gages. Through accuracy, Pratt & Whitney keyword since 1860, production costs are lowered...new products are developed...new industries arise . . . new jobs are created. Pratt & Whitney accuracy makes rare luxuries common. Man moves to ever-improving comfort, economy, convenience, health, safety...across the background of Pratt & Whitney accuracy.

Accuracy

PRATT & WHITNEY

Division Niles-Bement-Pond Co. • West Hartford, Conn., U. S. A.

Of course, impetus to the return of the "light car" and the rise of new competition for the Big Three was given by Studebaker when it introduced the Champion two years ago. This year Studebaker has a new Champion and expects to build and sell more than 150,000 automobiles, a 28 per cent increase over the model year just closing.

Studebaker Plans 15,000 Monthly

Each time these optimistic figures of the automobile industry are quoted, there are expressions of disbelief, but the estimates are honest expressions of opinion from prognosticators who have proved their mettle on numerous occasions in the past, so even the optimistic estimates can be accepted as authoritative. In each instance the estimates are being backed up in concrete form by stepped-up production schedules. Studebaker, for instance, plans 15,000 cars for production each month as the initial rate. "Studebaker has made a $5,000,000 bet on the 1941 model," George D. Keller, vice president, states—referring to the price of retooling for the new cars. This is $3,000,000 more than Studebaker spent in preparing for the 1940 models.

Changes in the higher-priced Studebakers are intended to accelerate the sale of these cars to a rate comparable to that set by the low-priced Champion in the two years since its introduction. Horsepower of the Commander engine is stepped up from 90 at 3,400 rpm. to 94 at 3,600 rpm. The size of the engine has not been changed but the compression ratio is increased from 6:1 to 6.5:1. Similarly, the President engine has been increased from 110 hp. at 3600 rpm. to 117 hp. at 3800 rpm. Compression ratio has been increased to 6.5:1. New body lines are displayed in the new Land Cruiser. Two-tone coloring and matching upholstery and trim are supplied on the Studebaker as on most other cars this year.

The Champion engine is increased in power from 78 to 80 hp., and in size from 164.3 cu. in. piston displacement to 170 cu. in. The cylinder bore remains three inches, but the stroke has been increased from 3⅞ in. to 4 in. Automatic choke is provided and over-drive is available in all models. Although the Champion has more power, is longer, wider and roomier, it has not outgrown its introductory classification as a lightweight car. It still has only 36.7 lbs. per horsepower and weighs less than 2,500 lbs.

How serious will be the effects of the defense program on plans for new model automobiles next year is becoming a more important question as the extent of eventual defense production becomes apparent. The automobile industry should have no difficulty in sticking to its resolution to maintain its production facilities unimpaired, superimposing defense production. However, tooling up for new 1942 models is likely to be a serious problem.

Tool and die shops in the Detroit area are rapidly nearing completion of their 1941 model programs for the automobile industry. It is anticipated that they will swing over quickly to filling orders for defense needs, although, to be matter-of-fact about it, very few of them have such orders yet.

More than one-third of the tool-making capacity in Detroit became available Sept. 1 for work on whatever orders are placed with plants here. Chester Cahn, secretary of the Automotive Tool and Die Manufacturers Association, reports that the remaining two-thirds of the 175 tool plants in the area continue to be occupied with work on previous commitments, mostly in connection with automobile jobs. These figures come from a survey which the association has made for the Army Procurement Division and the National Defense Council. Data do not cover the tool departments of automobile plants such as Ford, General Motors and Chrysler.

STAINLESS STEEL BELT MOLDINGS—the trim extending horizontally from the front of the hood along the side of the body below the windows—accentuates the lines of the 1941 Studebaker Champion custom cruising sedan. This car, which successfully invaded the low-priced field two years ago is longer, wider and more powerful than last year's model but remains in the 2500-lb. classification.

Auto Output Advances

Concern is felt lest many of the 12,000 employees of Detroit tool shops be put out of work temporarily and in the interim leave the city to seek employment elsewhere. The survey refers specifically to plants and men for producing tools, jigs and fixtures, and does not delve into the ramifications of the die business.

Automobile production in the final week of August moved upward to 27,645 units, compared with 23,732 in the previous week and 24,240 in the corresponding week of last year, according to Ward's Automotive Reports. Production in August was accelerated at a slower rate than was called for in original plans of automobile producers, reportedly because of difficulties in getting the "bugs" out of the production lineups after pilot cars were run through the lines.

BECAUSE IT MACHINES EASIER!

Ask a production man his reason for choosing Carpenter Stainless bar stock . . . and invariably back comes the answer, "Because it machines *easier*."

So often does this answer come, and from so many different types of plants, that it constantly confirms everything we have ever said about Carpenter Free-Machining Stainless Steel.

This ease of machining opens the door to many additional uses for stainless steel. Parts that were previously considered too difficult, and therefore, too expensive to make of Stainless, are now being turned out *economically* through the savings afforded by Carpenter Free-Machining No. 5.

The Carpenter representative with his specialized knowledge of stainless steels is prepared to help you select the grade best suited to your particular requirements. Get the benefit of his experience by taking up *your* problem with him.

THE CARPENTER STEEL COMPANY
Reading, Pa.

These paint spray nozzles are machined from Carpenter No. 5 (14% Chrome Iron). Drilling and threading are accomplished with ease. The machining speed is 175 feet per minute. Stainless Steel was adopted because it is easily cleaned and keeps the nozzle operating at highest efficiency. There is a Carpenter Stainless Steel to meet every requirement of manufacture.

Carpenter STAINLESS STEELS

BRANCHES AT Chicago, Cleveland, Detroit, Hartford, St. Louis, Indianapolis, New York, Philadelphia

Washington

BY L. W. MOFFETT
Washington Editor

• Pressure groups, helped by pork barrel politicians, fight to win new defense plants for unsuited areas . . . Roosevelt clears business of some charges by his aides, reports matter of "excess profits" still a problem

WASHINGTON—Of the multiplicity of difficulties in building up an adequate national defense is that relating to the location of new plants. Despite the policy to establish new and expanded facilities as a safety measure between the Alleghenies and the Rockies, whenever practicable, immense pressure is being brought to construct them in places which are wholly unsuited for them both from the point of security against attack and relation to materials they will require. Many of these requests come from the Midwestern plains states. The sincerity of business men and civic organizations making the requests is not doubted. But in Congress there are pressure groups exerting all the influence they have to get plants located in their states or districts when actually they know from information made available to them by military sources that the locations are entirely undesirable.

An interesting thing about this "lobbying" is that it comes so largely from those who attack industry for trying to capitalize on the defense program, or are charged with a "sit down" strike pending enactment of amortization legislation. This group in Congress clearly is seeking patronage. They are political patrioteers. They want to grab all they can from the government regardless of the dangers to it. They either forget or do not care that the startling downfall of France was encompassed by politicians who also resorted to self-serving practices.

Less Spent in Plains States

UP to the present, it is stated, 17 plains states have obtained less than 1 per cent on the expenditures for national defense contracts. These states, military experts have found, are not suitably situated geographically for defense plants. They are, however, just as important as the industrial states from a point of national defense, for they constitute an important part of the nation's bread basket. Without food supplies, industrial production would be of no avail to a country should it find itself besieged and unable to turn to agriculture for all or a substantial part of its needs. Defense orders thus are largely going to plants on or adjacent to the Atlantic and Pacific Coasts, while the plan being followed is to build new plants between the great eastern and western mountain ranges.

But so enormous is the pressure from pork-barrel politicians to have plants located in their particular bailiwicks without regard to strategic practicability that military experts are forced to waste valuable time hearing their pleas. Should this pressure succeed the national defense program would develop into a disorganized, hit-and-miss plan that would be disastrous to the safety of the country. Fortunately the pressure politicians so far do not appear to have made any headway. Nevertheless their activities are proving to be a source of concern.

It is probable, however, that these politicians are not going to get the gravy they are after. At least not much of it. In that event it may be expected that they will renew their blasts against big business and hold it responsible for blocking their patronage moves.

It is rather interesting, however, that these tirades against big business have proven duds. Perhaps the public is fed up on them. This absurd talk of a sit-down strike by big business, its "greed" for war profits and its desire for appeasing madman Hitler obviously may be expected to continue because demagogues always have harped on this threadbare line, thinking it makes good political capital. But it has become less strident, because the country realizes its hypocrisy and are aware of the purpose which prompted it.

Even the New Deal satellites, such as the Secretary of the Interior Ickes, who started this line of smear in an effort to cover up New Deal blunders, have for the present at least quieted down. Indeed they appear to have reversed the tactic. It is known that army and navy officials and other authorities engaged directly in national defense work have deprecated the attacks on business for its so-called "sit-down strike." These sources have consistently commended business for its cooperation.

Inner-Circle Claims Repudiated

NOW the President, noted for his blasts against the economic Royalists, has in effect repudiated charges of Ickes and others of the New Deal inner-circle.

Asked at a press conference last week if industry was holding up the national defense program because of a desire for "excess profits," the President said it was not. Rather, he laid blame for holding up the program at the door of Congress, though both in and out of Congress many think much of the blame lies with the President himself. For one thing it is complained that the National Defense Commission would do better than it has done if the President would select a chairman from its membership so the work could be better coordinated. Instead, Mr. Roosevelt insists on being the chairman. He has not officially

Do YOU KNOW WHERE all skilled wages go?

A breakdown of production costs to show the time spent in handling materials reveals the actual number of man-hours spent in common labor that are paid for at skilled work rates.

With an overhead handling system planned by American MonoRail engineers, man-power is released from handling labor.

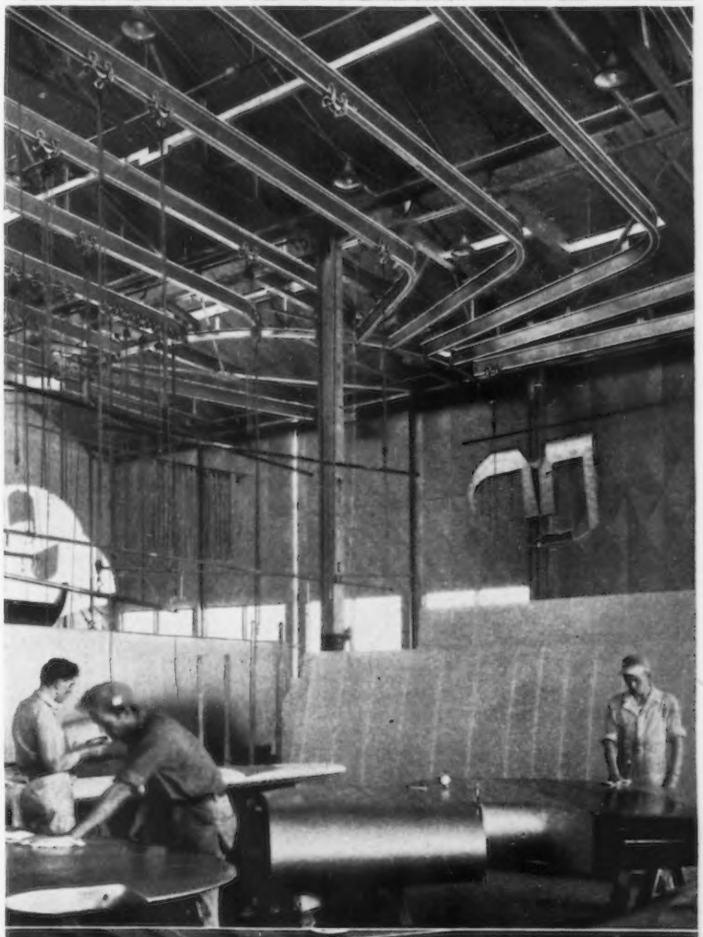
Mechanized methods for lifting and carrying reduce fatigue so that operators can apply full time and skill to production—

Loads are proportioned equally with process capacity—

Rehandling from unit carriers often is eliminated—

Materials and products kept on scheduled routes free from congestion or damage in transit.

Maximum return from skilled wages is therefore obtained only with a carefully planned handling system. Many such installations of American MonoRail show immediate savings large enough to pay their cost within a short time. Write for a copy of 254 page book illustrating hundreds of applications.



Engineering service with unbiased recommendation is available without obligation.

THE AMERICAN MONORAIL COMPANY

13103 Athens Ave. Cleveland, Ohio

conferred that title on himself but he performs in that role by proxy. Hence, the commission does not have the leadership it so greatly needs.

In any event, Mr. Roosevelt, exonerating business of charges made against it by some of his hatchet men, said that the matter of "excess profits" was a problem for Congress to consider. Apparently he realized the smear campaign was a bust and was doing his third term candidacy no good. Seeking to refute charges that the national defense program had bogged down, particularly with respect to airplane production, Mr. Roosevelt said that 10,015 army and navy planes were under construction and that deliveries now average 800 a month. Contracts were ready and industries seem to be satisfied, he stated, as long as they knew where they were going. Which is the attitude that industry has taken from the outset and for which it has been pummeled by bleeding hearts of the Ickes type who are only too willing to spend billions of the taxpayers' money but would not risk a dime of their own.

Slump in U. S. Machinery Exports Attributed to Collapse of France

Washington

• • • **Discontinuance of** shipments of power driven metal working equipment to France is assigned by the Machinery Division, Department of Commerce, as a major factor in the decline of industrial machinery exports in July to a value of $31,093,954, a drop of 15 per cent under June exports and 23 per cent under the April high of $40,613,663. The division made no reference to the fact that machine tools exports were made subject to licenses on July 5, and the effect the licensing system may have had on shipments abroad.

Exports of construction and conveying equipment, power generating machinery, as well as textile, sewing and shoe machinery also declined sharply in July. Mining, well and pumping machinery exports showed a marked increase in July over June, while shipments of "other industrial machinery" continued on about the level of the previous month.

July shipments of power driven metal working machinery amounted to $14,906,312, a 20 per cent decline from the June total. Exports of lathes dropped from $3,869,946 to $2,377,133; drilling machines from $1,176,998, to $844,539, and rolling mill machinery decreased from $2,844,832 in June to $1,006,770. Exports of milling machines in July, at $1,903,285, and grinders, at $2,316,361, were about the same as in June. Exports of construction and conveying equipment in July, amounting to $2,352,152, were 24 per cent below the June figure. Shipments of metal working machinery, other than power driven, were valued at $582,087 in July, a slight decline from the June figure. At $1,522,951, July shipments of power generating machinery were 28 per cent below the value of June exports.

A 25 per cent increase in the value of mining, well and pumping equipment in July, shipments totaling $4,746,107 as compared with $3,788,489 in June.

Exports classified as "other industrial machinery" were valued at $5,471,487 about the same as for the previous month.

Exports of railroad equipment in July, according to the Department's Motive Products Division, were valued at $1,292,509, a slight decline below exports in June. Exports for the first seven months of 1940 totaled $11,709,489.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

ONE TABLE-SPOON EV— WHUT'S THIS FOR, HAP?
OH, THAT? I DON'T KNOW—TH' DOC WOULDN' TELL ME SO I CAN'T TELL YOU
THAT'S FUNNY— A DOCTOR THAT WON'T TELL A GUY WHAT HE'S TAKIN' MEDICINE FER
I SEE TH' DOC'S IDEA— HE KNOWS SHOPS IS FULL OF TOBACCO AND TOOL BUMS, AN' HE'S GOT A EYE FER BUSINESS— I'LL BET THAT GUY'S GOT LATHE LIVER AND A SPOON IN HIS POCKIT
THE INVALIDS
J.R. WILLIAMS 9-6
COPR. 1940 BY NEA SERVICE, INC. T. M. REG. U. S. PAT. OFF.

Sheet Price Situation Improves, C. R. Hook Says

Charles R. Hook, president, American Rolling Mill Co., said recently that while there had been an improvement in the sheet price situation and better earnings were in prospect, he did not care to make any statement with respect to the possibility of a resumption of dividends on the common stock of that company. The outlook for the sheet business for the fourth quarter is encouraging, he said.

Steel Imports Down To 3390 Tons in July

• • • **Imports of iron and steel** products (scrap excepted) registered another sharp decline in July when only 3390 gross tons of these materials valued at $351,826 entered the United States, preliminary figures released by the Metals and Minerals Division of the Bureau of Foreign and Domestic Commerce show. June receipts had totaled 5504 tons valued at $530,343, while in July, 1939, the trade in these goods had amounted to 27,516 tons valued at $1,285,390.

Pig iron was the chief commodity imported in July in point of tonnage received — the 1067-ton total including 717 tons from Canada and 350 tons from British India. Receipts of spiegeleisen—662 tons—were all from Canada, while of the 319 tons of ferromanganese which entered the country 284 tons are accredited to Norway and 35 to Japan. Canada was the source of 444 tons and Mexico of 86 tons of the 531 tons of railway track material imported in July, while Sweden supplied the entire 256 tons of flat wire and steel strip brought in during the month.

July imports of pig iron, iron ore and manganese (all in gross tons) follow:

Pig iron	1,067
Canada	717
India	350
	1,067
Iron ore	249,398
Chile	152,900
Brazil	36,375
Canada	33,841
Cuba	17,400
Spain	5,510
Iran	2,500
Mexico	771
U. K.	100
Manganese—35 per cent and over	
Battery grade (all from Gold Coast of W. Africa)	1,339
Other	37,681
Russia	11,588
Cuba	8,058
Union of S. Africa	5,750
Brazil	4,194
Gold Coast	3,183
British India	2,738
Philippine Islands	1,825
Netherland Indies	286
Mexico	59

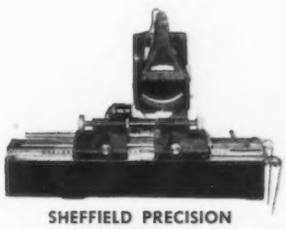
SWOC Loses in Vote At Pickands-Mather

Iron River, Mich.

• • • **A NLRB election conducted at two iron ore mines of Pickands, Mather & Co. here last week, resulted in the Steel Workers Organizing Committee being defeated by an independent union, 209 votes to 106.**

THE *All-American* GAGE

SHEFFIELD ELECTRIGAGE



SHEFFIELD PRECISION THREAD LEAD CHECKING MACHINE

SHEFFIELD VISUAL GAGE

SHEFFIELD TAPER CHECKING MACHINE

SHEFFIELD UNIVERSAL INTERNAL MEASURING MACHINE

ALL Sheffield Gages are made right here in the United States by American workmen and from American materials. Their manufacture is in no way dependent on the fortunes of foreign wars or the difficulties of high seas transportation.

And they have proven their unmatched accuracy, durability and gaging speed in American industries and laboratories.

Standardize on Sheffield Gages with security and with profit on your inspection operations. Write for descriptive bulletins.

SHEFFIELD
GAGE CORPORATION • DAYTON, OHIO, U.S.A.
MASTER GAGEMAKERS
NITRIGAGES

Fatigue Cracks

BY A.H.DIX

Succor for the Oriflammed "Whitey"

• • • Before seeking to remove the less-than-five-microns dust particle from "Whitey" Maurath's eye, for coining "Insomniaists," how about getting the I-beam out of your own? Right after giving him the business, you use one which certainly is a . . . (naughty word). I allude to "intraplant," which I would rank with "therblig" and only slightly ahead of the verb "contact."—*A. W. Miller.*

We didn't coin "intraplant," and before getting this squawk we regarded it as strictly kosher. But our motto is "Wrong or right, the cash customer must be served." So out it goes.

On our index expurgatorius we also cheerfully place "readership," a word of doubtful parentage used freely by the trade press. It has always griped us.

Kill That Bleed

• • • The expressions peculiar to any line of endeavor seem to be perpetuated by the young people in it. In talking shop young railroad men, advertising men, printers, garage men, lawyers, newspapermen and lunchwagon operators strive to make themselves as unintelligible as possible to the layman. Then after they become seasoned and no longer have to prove anything they go back to simple English. The hardest reading is a young lawyer's brief, the easiest a U. S. Supreme Court decision.

Wabble Whimsy

• • • The patriotic tone of your editorial page is not reflected in your advertisements. The Mackintosh-Hemphill ad on page 117 of the Aug. 22 issue, for instance, mentions "The Rolls with the Red Wabblers." Sounds like fifth columnists.

My idea of a Red wabbler is a Communist who deviates from the party line. The picture shows the Red, but not the wabble. What is a wabbler, and why should it?—*Reader No. 14.*

A wabbler—or wobbler, as it is more frequently spelled—is, to quote Webster, "Either of the grooved ends . . . that project beyond the housings and transmit power to a roll from the coupling boxes." The dictionary also remarks that a wobbler resembles either a trilobate or a quadrilobate gear wheel in cross section, but as that will only confuse Reader No. 14 we won't mention it.

So far the term "fifth columnist" has not broken into the ads. Although any day now we expect to see it applied to corrosion, avoidable friction or any other kind of waste.

Baltimore Oriole Chirps Sourly

• • • The mordant McC., who writes us scurrilous, anonymous notes from Baltimore, addresses the latest to "*Fatiguing Cracks.*" We hope soon to change to "*On Second Thought.*" As the diner said to the waiter who put his thumb into the soup, gravy and coffee, "*Bring me a hard-boiled egg and see what you can do with that.*"

A Period After Every Word

• • • Already it is getting so that you can go all the way from 400 to 1400 on your radio dial without getting anything but political speeches, and most of them unpalatably dished out. With ghost writing now accepted as respectable, perhaps the next step will be ghost speaking, which would relieve us of nightly exhibitions of bradyphrasia. The delayed delivery, which is highly effective when accompanied by changing facial expressions and making with the hands, is annoyingly slow on the air. Most of us can listen faster than most political speakers talk, and to keep their C.A.B. rating above sea level, they ought to learn to get in more syllables per second.

Remington Rembrandt

• • • The most literate member of your favorite family journal's staff is unquestionably Leon Wesley Moffett, whose Washington report (turn back four pages) is at once an accurate moving picture (in Technicolor) of the Washington scene and a lesson in the art of putting one word after another.

As an example of Moff's word painting we quote this from a recent Washington page:

> In forcing an unwilling convention to accept as his running mate, Slow-to-Resign Henry A. Wallace, with millions to hand out to the farmers, Mr. Roosevelt selected a man who, colorless and mystic as he is, is the intellectual superior of the President. Consequently should the President's primogeniture ascend the throne, Mr. Wallace undoubtedly could expound the New Deal "philosophy" more coherently, if such an economical nondescript as the New Deal can be adjusted to coherence, than has been done by Mr. Roosevelt.

Finding a flyspeck in such a gem is like complaining that Venus de Milo is a little too thick in the thigh. But shouldn't the 49th word be *primogenitor?*

Truth in Journalism

• • • We get kind of tired of having the newspapers refer to us as "the steel trade's leading journal," with only an eighth of our subscribers in the producing end of the industry. What we like is the Detroit *Free Press'* introduction—"THE IRON AGE, the authoritative manufacturers' journal." Well-edited newspaper, that.

Puzzles

• • • R. W. (Claud S. Gordon Co.) Weld sends us this example in higher mathematics from the *Indianapolis Times:*

> Each ambulance costs $1,350. Of this amount, $1,050 is for the vehicle itself and $3,000 for maintenance after it reaches England.

He also propounds this variation of an old one:

> *A tape is fitted smoothly around the earth at the equator. The tape is then cut and an additional 314.16 ft. inserted. How far off the surface of the earth all the way around will that raise the tape?*

An answer in seven seconds, arrived at in your head, gets you an A+ on your report card.

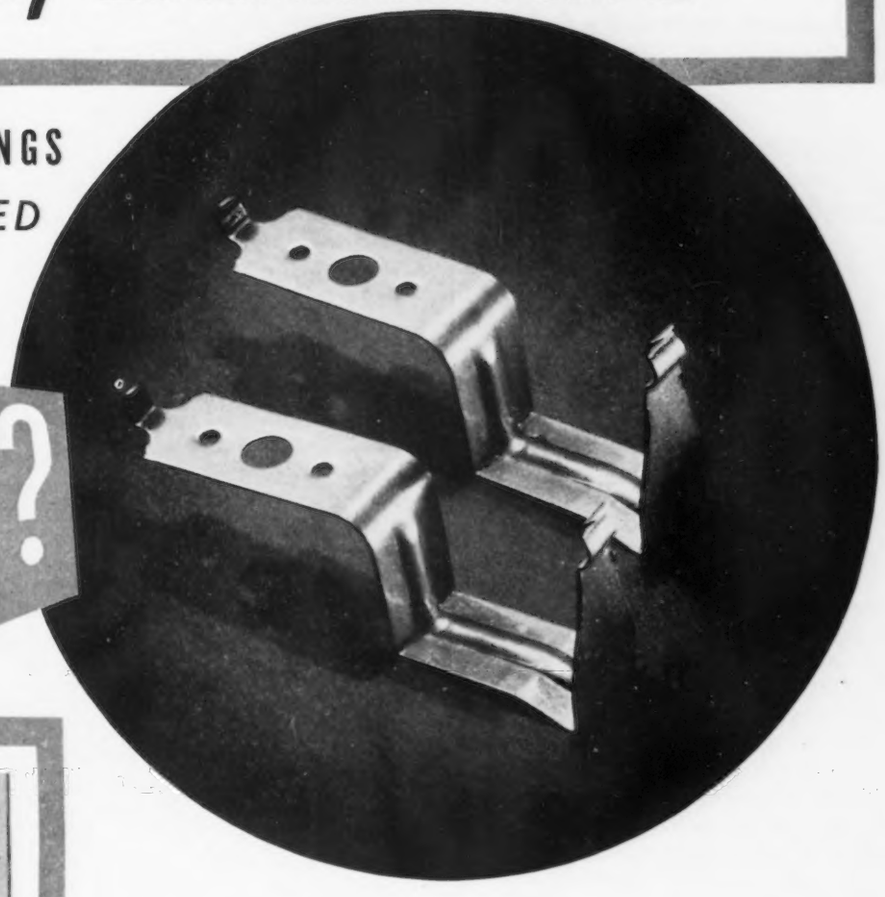
Vernon Moore, C. E. Bliven, H. M. Oshry and J. A. Davenport agreed that the Aug. 22 cockroach traveled 5614 ft., but some of the master minds complained that the problem was poorly expressed. It should have read "other end wall" instead of "either end wall," they said. Which accounts for the fact that by chasing the roach over the short route J. A. Davenport arrived at an answer of 5.6569 ft.

A correct answer to this in 30 min. will get you into the Air Corps without an entrance examination. (*In his series on national defense Col. H. A. Toulmin, Jr., says "Every intelligent soldier of the slightest experience with air corps work knows that most ships last no longer than the average pilot's life.*)

> A plane is flying at an altitude of 1200 ft. and at 100 ft. per sec., over an area protected by an anti-aircraft gunner. If the gunner fires the instant the plane is directly overhead, at what angle with the ground should the gun be pointed in order to make a direct hit? The velocity of the bullet is 1000 ft. per sec.—*Sent in by Thomas Abraham, Arnold, Pa.*

Bright HARDENING

ONE OF THESE SPRINGS HAS BEEN *HARDENED* AND ONE HASN'T...



WHICH IS WHICH?

IF YOU HARDEN SPRINGS, STAMPINGS, OR SIMILAR PARTS – *CHECK THESE SAVINGS!*

√ ***Cuts Production Costs:*** Actual tests show Hydryzing increases production of small parts as much as 85% because of simplified handling.

√ ***Speeds Production:*** No sandblasting and no cleaning. No waiting or lost time while parts are being shifted to other departments for cleaning operations.

√ ***Better Appearance:*** Sandblasting or pickling always pits surfaces of work, however minutely. Hydryzed work has original smooth shiny surface so that plating is smooth and lustrous. Less buffing is needed to produce full lustre.

√ ***No "Soft" Work to be Rejected:*** Hydryzed parts are fully hard because they are completely protected, while in furnace, against loss of carbon. Also, their clean, scaleless surfaces receive full benefit of quench insuring uniform hardness on every lot.

Does your production involve the hardening of springs, stampings, screw machine parts or other such small to medium size items? If so, you've probably wondered how you could harden those parts without scale or discoloration. You can! And not only harden them without scaling or discoloring, but harden them bright, so bright that you can place an unhardened piece beside one that has been hardened and not be able to tell which is which. Hundreds of thousands of springs and other parts are being BRIGHT HARDENED every day by means of the Hydryzing Process, and because Hydryzed parts come from the quench with their bright original finish, hundreds of dollars are being saved each week in the elimination of sandblasting and other cleaning costs. Consider the savings Hydryzing will make in your plant, in time, in labor and cleaning supplies *plus* the greatly improved appearance of the parts over those hardened by older methods. Just drop us a note and we'll send a packet of Hydryzed samples and descriptive literature.

Lindberg Engineering Company

228 North Laflin Street Chicago, Illinois

LINDBERG CYCLONE FOR TEMPERING HYDRYZING FOR HARDENING

News of Industry . . .

Engine Order to Cost $160,000,000

Washington

• • • **United Aircraft Corp.** has agreed to manufacture about 17,000 Pratt & Whitney engines at a cost of approximately $160,000,000 for the Army and Navy.

The engines will cover the entire joint requirements of both military branches for the fiscal years 1941 and 1942.

Contingent upon passage of the $4,900,000,000 supplemental defense bill, the agreement requires that the United Aircraft Corp. provide at its expense the buildings required for the expansion of its program.

The machine tools required to equip the buildings will be provided under separate contract by the Navy with government funds and title to the tools will be vested in the government. Formal contracts are in process of preparation and will in this instance be executed by the Navy Department and Pratt & Whitney. Engines delivered in the Army will be paid for by transfer of Army funds to the Navy. In like manner the Army will in turn negotiate all Navy engine requirements with manufacturers under its cognizance.

Secretary Knox pointed out that the procedure followed in letting these contracts is strictly in accordance with existing laws and will require no additional legislation. Recently officials of the United Aircraft Corp. said that they had been proceeding with preliminary construction at their own expense and the agreement just made, Secretary Knox said, will not only add impetus to work already in process but will definitely assure rapid institution of the entire Pratt & Whitney engine program.

Bendix Products Gets Loan for Expansion

South Bend, Ind.

• • • **Bendix Products Corp., manufacturer of airplane carburetors, struts and landing gear parts, has obtained an $18,000,000 RFC loan with which production will be increased at least 25 per cent in the next few months. All five plants of the company will be expanded to some degree and a new plant in Baltimore may possibly be constructed.**

Draft-Industry Move Opposed

Washington

• • • **The Senate Overton-Russell** "draft industry" amendment to the conscription bill is expected to be the object of vigorous controversy in the House. But unless it should be opposed by the Administration it is believed that the lower branch of Congress will approve the Senate's action and thus become a law.

The conscription bill with the amendment was passed by the Senate on Wednesday of last week. The vote on the amendment was 69 to 16.

The amendment extends to the War Department the same power as was given the Navy Department in a naval bill approved by the President on June 28. The present law permits the Secretary of the Navy to fix compensation to the owner of a plant or facility which could be taken over by the Navy Department in the event it was unable to agree with a contractor on price.

Senator Russell, Democrat of Georgia, who with Senator Overton, Democrat of Louisiana, sponsored the amendment to the con-

U. S. DEFENSE RESTS ON ABILITY TO OUT-PRODUCE POSSIBLE FOES

• • • **National defense rests** strongly upon ability of the machinery-producing industries to equip our labor supply to out-produce any possible combination of nations to which we might be opposed. Farrel-Birmingham, Inc., declares in its recently published study, "The Great Reliance for National Defense." The Ansonia, Conn., company says:

"In terms of labor supply our country has presently available some 55,000,000 persons, of which about 45,000,000 are employed. These figures compare with the combined total labor supply of Germany and Italy of 56,000,000 persons. With the labor supply of Austria, Czechoslovakia and Poland added the Axis powers have available 80,000,000 to 85,000,000 workers; with France and Belgium included, the total becomes upward of 110 million persons.

"Unless our per capita productivity is enormously greater, even 56,000,000 workers of the Axis powers employed at 50 to 60 hr. per week as compared to our 45,000,000 workers at shorter hours represents an overwhelming advantage. In terms of man-hours per week, the Axis powers can concentrate some 2.75 billion man-hours as compared to some 1.80 billion man-hours in the United States.

"The only factor which compensates for our relative inferiority in man-hours is the tremendous productivity per man-hour of our highly mechanized industries. Compared with 1914, when we used approximately three hp. per worker in manufacturing industry, we today command something over five hp. per worker.

scriptin bill, said the law as it now stands is of doubtful constitutionality because it involves the taking over of property without due process of law. For this reason, he said, the Overton-Russell amendment strikes out the proviso which permits the Secretary of the Navy to fix the compensation of the owner of the plant and provides for the institution of condemnation proceedings. Upon the filing of a declaration of taking, the government could assume immediate control and either run the plant with government personnel or by private contract. Added to the proviso was an amendment offered by Senator Wagner, Democrat of New York, rendering the amendment inapplicable to labor and safety laws. The point of the Wagner amendment is to bar conscription of labor.

Russell said the "draft industry" amendment is designed to assure against any strike of business in performing national defense contracts, and with other senators argued that if man power is to be conscripted so should industry. He claimed that the national defense program has been slowed down by refusal of manufacturers, particularly subcontractors, to accept government orders pending suspension of the Vinson-Trammell profit limitation act.

Russell said his amendment is not intended to reflect upon American industry, adding that "undoubtedly 98 per cent of the industry of the country is as loyal and as patriotic as any other class of our citizens."

Newfoundland Will Buy More U. S. Road Machinery

Washington

• • • **The outlook for** increased sales of American roadbuilding machinery in Newfoundland during the current fiscal year appears definitely favorable, according to the American Consulate General, St. John's.

One local machinery organization, which accounts for 90 per cent of all the road equipment sold in this market and represents United States firms exclusively, expects to sell at least $50,000 more road machinery during 1940-41 than in the preceding fiscal year.

Ickes Urges Defense Plants on Columbia

Washington

• • • **Construction** of national defense plants as a corollary of the Bonneville-Grand Coulee dam projects on the Columbia River is recommended in a report submitted to the National Defense Advisory Commission by Secretary of the Interior Ickes. The report was prepared by Undersecretary of the Interior Alvin J. Wirtz and Bonneville Dam Administrator Paul J. Raver.

The report proposed the following plants and products: For aircraft engines, ordnance and shipbuilding—aluminum rolling mills, magnesium plants using electric furnace methods, alloy steels and ferro-alloys; munitions—brass for shell casings and fuses, synthetic nitrogen for explosives, smoke-creating chemical mixtures, war gases; plastics for airplane parts.

Plans for Safety Congress Announced for Oct. 7-11

• • • **The complete program** for the 29th National Safety Congress and Exposition, to be held at the Stevens Hotel in Chicago, Oct. 7-11, has been announced by the National Safety Council, Chicago. The 25 sections of the council will hold separate sessions devoted to the various problems of each field. The sessions conducted by the automotive and machine shop section, metals section and power press section are particularly applicable to safety work in the metal working industry.

Ernest T. Weir, chairman of the National Steel Corp., is to present an address at a luncheon on Oct. 8 before the metals section. The banquet speaker on Oct. 9 is to be Dr. Allen A. Stockdale, National Association of Manufacturers, whose topic will be "Safety and the American Way."

Coming Events

Sept. 18 to 20—National Industrial Advertisers Association, annual conference, Detroit.
Sept. 18 to 20—Grinding Wheel Manufacturers Association, Abrasive Grain Association, meeting, Osterville, Mass.
Sept. 19 to 20—Concrete Reinforcing Steel Institute, semi-annual meeting, Skytop, Pa.
Sept. 24 to 27—Association of Iron and Steel Engineers meeting and exhibition, Chicago.
Oct. 2 to 5—Electrochemical Society, Inc., fall meeting, Ottawa, Canada.
Oct. 7 to 11—Twenty-ninth National Safety Congress and Exposition, Chicago.
Oct. 13 to 16—American Gear Manufacturers Association, semi-annual meeting, Skytop, Pa.
Oct. 16—Porcelain Enamel Institute, fifth annual forum, Urbana, Ill.
Oct. 17 to 19—American Society of Tool Engineers, semi-annual meeting, Cincinnati.
Oct. 21 and 22—Associated Machine Tool Dealers of America, annual convention, Dayton, Ohio.
Oct. 21 to 25—National Metal Congress, Cleveland.
Oct. 31 to Nov. 2—Society of Automotive Engineers, national aircraft production meeting and exhibition, Los Angeles.

National Cylinder Gas Co. In Merger at Chicago

• • • **The proposed** merger of Compressed Industrial Gases, Inc., and the National Cylinder Gas Co. was approved last week at a stockholders' meeting. The merged company will operate as the National Cylinder Gas Co.

C. J. Haines, president of National Cylinder, will continue in that office while H. B. Pearson, president of Compressed, will serve as chairman of the executive committee. M. Keith Dunham, now chairman of the National board, will occupy the same position in the merged company.

July Structural Steel Orders at 3-Year Peak

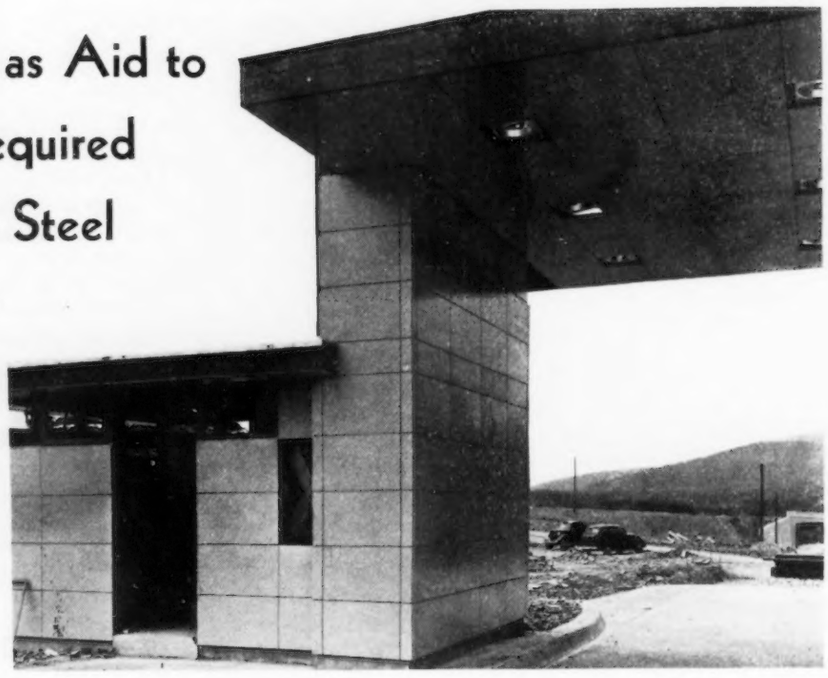
• • • **Fabricated structural** steel orders booked in July totaled 184,499 tons, highest monthly total in three years and comparing with 109,744 tons in June and 114,056 tons in July, 1939, reports the American Institute of Steel Construction. Total of bookings for the first seven months of the present year is 803,730 tons, compared with 780,303 tons in the corresponding period of 1939.

Shipments of fabricated steel reported for July declined to 117,438 tons from 119,087 tons in the preceding month. In July, a year ago, 110,473 tons were shipped.

Tonnage available for future fabrication at the close of July was 457,401 tons, a backlog of roughly four months work.

New Turnpike, Seen as Aid to U. S. Defense, Required 46,000 Tons of Steel

By T. C. CAMPBELL



—*Courtesy Carnegie-Illinois Steel Corp.*

• • • **Progress photograph showing partially completed ticket station, utilizing porcelain enamel panels.**

• • • **Conceived as the** most modern toll super-highway in the United States, for the regular use of automobiles and trucks between Pittsburgh and Harrisburg, Pa., and built with the highest and most advanced type of highway construction, the new Pennsylvania Turnpike which soon is to be opened publicly, emerges as a strategic national defense adjunct.

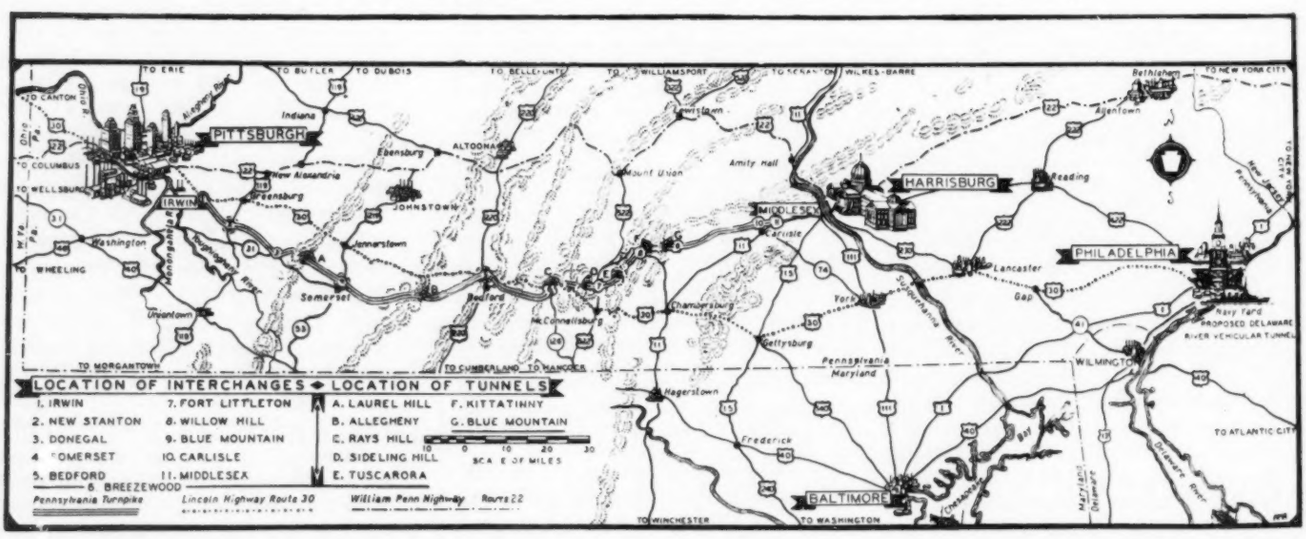
The defense value of the new 160 mi. super - highway was brought out recently when cabinet members, senators, congressmen, federal administrators, industrialists, and other important personages previewed the engineering achievement. Said Senator Sheridan Downey, California: "Proposals have been made to extend the Pennsylvania Turnpike. No sounder move than highway projects could be made. We need it now more than ever to prepare our roads for the use of motorized and mechanized army equipment. As a member of the Senate Committee on Military Affairs, I know what untold benefits highway progress can bring to military operations."

Extension of the road to Philadelphia certainly may be described as a probability, according to the Pennsylvania Turnpike Commission. Authority for such extension has been granted by the Pennsylvania General Assembly and turnpike chairman, Walter A. Jones is said to be making progress in raising funds to finance the project. Agitation has also been started for an extension westward.

Approximately 46,000 tons of steel was consumed in the construction of the super-highway, 15,000 tons of which was reinforcing steel and the remainder, including plate girders, structural shapes, I-beams, T-beams, and miscellaneous items, for rigid frame concrete overpasses and tunnels.

Since no other highway is permitted to cross the turnpike at grade, it was necessary to build 160 over and under passes to carry

• • • **Detailed map showing the route of the new $70,000,000 Pennsylvania Turnpike.**



—*Courtesy Penna. Turnpike Commission*

cross roads over or under the turnpike. To span rivers and streams along the way, 139 bridges were required, ranging from 6 ft. culverts up to a 600 ft. viaduct.

Designed by the staff of Capt. Gerald R. Tyler, chief architect, Pennsylvania Turnpike Commission, the ticket stations consist of a structural steel frame made of 3-in. channels completely finished on the exterior with architectural porcelain enamel. The interior walls are finished with 18-gage insulated steel sheets welded to the steel studs. Each ticket office consists of a utility building with the miscellaneous equipment necessary to the maintenance of the station, plus facilities for collectors and a huge canopy, 22 ft. wide, and from 30 to 100 ft. long, depending upon the location, extending across the roadway.

The architectural porcelain enamel panels were designed and manufactured by the Enamel Products Co., Cleveland, and the Ingram-Richardson Mfg. Co., Beaver Falls, Pa. The unique panels manufactured from 16-gage U. S. S. vitranamel steel sheets, are fastened directly to the structural steel frame of the building through 14-gage steel plates tack-welded to the framing where four corners of the adjacent porcelain enamel panels come together. The panels, one in. in depth, have a special flange design which acts as a water seal and the system of construction is such that damaged panels can be removed with a minimum of effort and delay.

Under normal working conditions, according to the fabricators, it takes an eight-man crew about four days to erect the steel work for one of the ticket stations. A six-man crew can apply the porcelain enamel panels, which cover approximately 2500 sq. ft. of side wall and ceiling area in the standard station, in four days. Another day is required for completely caulking and washing down a building. Four men can install the aluminum trim on the station in three days. It is estimated by the builders that because of the simplicity of erection, and due to the unique design of the standardized architectural porcelain enamel panels, it will cost about 75c. a sq. ft. "in place" for the porcelain enamel exterior finish as applied to the completed structures.

Welding Can Speed Defense Production

Cleveland

• • • **Production for national defense** could be speeded up immensely and the five to seven-year period estimated time for completing the program could be greatly shortened by full utilization of welding, according to figures released by the James F. Lincoln Arc Welding Foundation, Cleveland. Battleships, destroyers, submarines, aircraft, tanks, gun mounts, scout cars, tractors, trucks, railway artillery, as well as industrial equipment for armament production, could be produced in 30 per cent less time than required for conventional methods and at approximately similar cost savings, according to E. C. Powers, assistant secretary of the foundation. This estimate is based upon reports covering the application of arc welding to virtually every type of industrial product and structure. The most outstanding examples of these studies were recently published in book form.

The possibilities for speeding up defense production and advancing the completion date of armaments and other defense equipment are suggested in the accompanying table of statistics compiled by the foundation.

EXAMPLES OF TIME, COST AND WEIGHT SAVED WITH ARC WELDING

Item	*Production Advantages*	*Operating Advantages*
9-ft. anti-aircraft combat car	Elimination of extra parts and manufacturing operations.	Elimination of danger from bolts and rivets being driven into the tank; speed over 100 miles per hour; climbs grades of 50% inclination; as easy to drive as motor car.
10,000-ton cruiser	Saving of 17% in weight, 3% in cost.	Greater maneuverability, operating speed and carrying capacity through reduced deadweight.
Two 92-ft. tug boats	20% reduction in construction time; built in only 7 weeks.	Increased carrying capacity through elimination of deadweight; elimination of dangers of rivets being driven into hull by high-powered guns.
Submarine mine layer	Construction time reduced 25%; 15% savings in weight.	Permanently leak-proof construction elimination of rivets and their danger of being driven into the interior.
610-ft. cargo vessel	Weight reduction 16.2%; Cost saving of 25.9%; 20% saving in construction time.	Greater safety at sea through increased strength; increased carrying capacity by elimination of deadweight; removal of rivet hazards.
Airplane landing gear forks	50% saving in production time; saving of $40 per airplane.	Increase of 23.6% in structural strength, thus increasing operating safety.
Beaching gear for large aircraft	Cost saving of 31.7%; 20% weight saving; production time saving of 20% to 25%.	Easier maneuverability through greatly reduced weight.
Field service truck body	A saving of 25% in weight; cost saving of 32% saving in production time 15% to 25%.	Saving in fuel cost by weight reduction; increased service life through a permanently tight construction; reduced cost of maintenance.
Trailerized tank	Approximately 15% weight saving; 25% to 30% saving in production time.	Increase of 15% in payload capacity through reduced weight.
Locomotive frame	Cost saving of 47.5%; weight saving 27.5%; saving in production time 30% to 35%.	Greater payload capacity; higher operating speed.
Locomotive boiler	10% cost saving; 10% saving in weight.	Increased service life; reduced maintenance; high efficiency.
Rotary planing machine	89% saving in production time; cost saving of approximately 70%	Increased efficiency and service life through greater rigidity of structure.

Industry's Reaction to the Toulmin Series on National Defense

SO heavy is the deluge of comments precipitated by Col. H. A. Toulmin, Jr.'s 7-chapter series on national defense that space limitations forbid quoting all. The following are typical of the letters received by Colonel Toulmin or THE IRON AGE:

"I have just finished reading with most sincere approval your article, 'We the Payers' which appeared in the July 18 issue of THE IRON AGE. I wish it were possible to get a copy of it into the hands of the rank and file of our people. I am sure it would have a profound effect."

—Charles R. Hook, President
The American Rolling Mill Co.

"I have read with great interest and sincere admiration your article, 'Winning Wars Without Words.'

"I want to congratulate you upon the very excellent summary of the diseases which are progressing in our political, economic and social life. I have been attempting in a feeble way to sound similar alarms and I am always cheered when I see someone else doing such a fine job along these lines."

—W. C. Mullendore, Exec. Vice-Pres.
Southern California Edison Co., Inc.

"We would like to get about 25 reprints of the article by Col. Toulmin, Jr., and Mr. Van Deventer's editorial 'Meet the Man,' for distribution to our friends."

—Geo. W. Bach, General Manager
American Sterilizer Co.

"We would appreciate about thirty reprints of the article, 'We the Payers' by Col. H. A. Toulmin, Jr."

—L. E. Kinn, Pres. and Gen. Mgr.
The Seneca Wire & Mfg. Co.

"This is to ask if the articles may not be made available in phonographic transcripts suitable for radio broadcast use. The Colonel's discussion should have circulation, and lots of it in the right places."

—M. G. Stewart, President
Pelican Well Tool & Supply Co.

"I have looked with disappointment through your issue of July 25 for information on Col. H. A. Toulmin, Jr.; or should I know him. I should like the following information:

"1. Is Junior an army coloned or a Kentucky colonel?

"2. If service in the last war determines whether you kiss or curse the dictators, the Colonel must have been passing out cigarettes at the Hoboken pier!

"3. Why doesn't he send his jokes to your column?

"4. If Junior is really a soldier, and if his ideas of running an army are as old-fashioned as his ideas on labor relations, I will have my twelve-year-old boy stand shoulder to shoulder with him—he shoots a B-B gun too.

"5. Why should I let him interrupt a good half-day's work?"

—A heat treating equipment builder

"When someone writes an article that agrees with your line of thought, you naturally think the writer is smart.

"I consistently read every issue of your magazine, particularly the editorials. I have always thought you were on the right track, and expressed yourself in an abnormally clear way. However, from now on, you are just running a poor second to Colonel H. A. Toulmin, Jr. His article commencing on page 28 of your July 25 issue, out-ranks in my opinion anything you have ever done.

"I am writing this letter to ask if it would be possible for you to secure for me about a thousand reprints. I will be glad to pay the costs that you would be put to."

—Harold L. Martin
Vulcan Foundry Co.

"An ex-2nd Lt. of U. S. Field Artillery salutes the Colonel on the excellent article in IRON AGE. I dare say there are thousands of people like me having a tremendous desire to get one's teeth into this situation. The very trouble is knowing with what to align oneself. I subscribe to every one of your points heartily."

—M. S. Kice, Jr., Chief Engineer
American Blower Corp.

"I have read with thorough enjoyment and appreciation your article in THE IRON AGE, July issue, 'Winning Wars Without Words.' Would you grant us permission to print excerpts from this fine article?"

—H. H. Hartley, Managing Editor
Toledo Times.

"It seems to us that the information contained in Col. Toulmin's articles should be much more generally known than it will be known if limited to the readers of any trade publication even if this publication does happen to be THE IRON AGE. We were occasionally wondering if you were arranging to distribute this in booklet form and if so would like to know cost of same."

—C. M. De Forest, Asst. Manager
Sowers Mfg. Co.

"May I take this means of telling you what a wonderful article, 'Winning Wars Without Words' by Col. H. A. Toulmin, Jr., is, in my opinion.

"Exactly the truth—and what a shame such an article cannot be put out for general circulation among many more people than it can reach through THE IRON AGE—to farmers, wage earners and might I say the bulk of the middle class. Again I say it is a wonderful article."

—Harry J. McKinney
McKinney Steel & Sales Co.

"You have undoubtedly been told numerous times that your editorials are about the 'tops' of any magazine editorials of today.

"The series of articles started in last week's IRON AGE by Col. Toulmin, however, are going to run you a close second if they keep up as they have started. Is there any possibility that the complete series will be reprinted or published in a combined form?"

—Donald E. Dickey,
Research Engineer
Broderick & Bascom Rope Co.

"We think the article by Col. H. A. Toulmin, Jr., on 'Winning Wars Without Words' is one of the best articles along this line that we have seen, if not the best.

"We also enjoy and appreciate Mr. Van Deventer's editorials."

—Wheeler Lord, President
Nicetown Plate Washer Co., Inc.

"In reading Col. Toulmin's articles on 'Boondoggling' I am in total agreement with Voltaire who said, I quote from memory, 'I thoroughly disagree with everything you say but shall die for your right to say it.' There are some matters which Col. Toulmin apparently overlooks. Our Navy should be and was, up until recently, kept largely on a war-time footing, both as to training and equipment because you cannot build naval units over night. I have never met a civilian who would have the temerity to feel that he could assume command of a naval unit or fleet. On the contrary, I also have yet to meet a civilian who did not consider himself thoroughly competent to accept the command of anything from a squad up to an army corps, although I know many soldiers who, realizing their limitations, would shudder at such a prospect.

"Our Army has always been rapidly demobilized and forgotten as quick-

ly as possible after the last shot of the war was fired. Their appropriations are largely influenced by politics and must be stretched to the point of a permanent set. Knowing that appropriations will, at the most, only extend to a pilot weapon of war, the designers thereof are always striving for change towards achieving perfection in order that when our characteristic hysteria preceding the crises of war arrives there may be something upon which to build the country's armament. Today is the first time in the history of the United States that preparation of any kind, shape, or description has preceded a declaration of war. Hence, it may be in some measure excusable if the Ordnance and other supply branches of the Army are caught with their pants at half mast.

"Why perfection? Because when you are dealing with the death of your enemy you may not forget the life of your army. The 'nearly perfect' projectile may kill more of your own men than a Fifth Columnist. This was not realized by the perpetrators of the 'flaming coffins' nor a certain gun in my command north of Verdun, which I distinctly recall as creating a shambles among our men just east of the town of Forges on a bright October morning in 1918. In that business the same standards should be maintained as that which was lacking in a certain prospective father-in-law who admitted to the prospective groom that his daughter was 'just a leetle pregnant.'

"Ever since I became associated with the U. S. Army and for all the years subsequent thereto I have heard the vigorous and, may I say, intemperate criticism of the commissioned personnel. The over-worked term 'pot-bellied, incompetent, generals sitting at desks in the War Department' are difficult to recognize in the herring-gutted McFarlands, Chaffees, etc. During these same long years dating from 1901 I have heard of the 'West Point clique' which preyed upon the non-graduate from civil life or the ranks and, yet somehow, although constantly in contact even now with my former associates I have yet to hear anything but the highest admiration expressed for the present Chief of Staff who never saw West Point but came from civil life and one James G. Harbord who served, as he once expressed it in my presence, at San Antonio both in the capacity of Sergeant and Major General of the Regular Army.

"However, these criticisms have extended over so many years and are so consistent that I cannot but feel that they must be just, and suggest as a remedy that the extremely expensive and manifestly incompetent U. S. Military Academy be abandoned. We might then have available for leadership such military experts as Boake Carter, Jay Franklin, Al. Williams, George F. Elliott and Col. H. A. Toulmin, Jr., which would undoubtedly strike terror to the hearts of our prospective enemies."

—Col. W. W. Rose,
Executive Vice-President
Gray Iron Founders' Society, Inc.

"The articles by Col. H. T. Toulmin, Jr., are excellent and most timely.
"If you have planned to reprint same, enter our order for one hundred."

—Seymour J. Baum
B. H. Aircraft Company.

"These articles offer the best current treatment of the nation's problem that we have come into contact with."

—W. W. Sieg, General Manager
Titan Metal Mfg. Company.

"I have read with a great deal of interest the article 'We the Payers' written by Colonel H. A. Toulmin, Jr.
"I am wondering if it would be possible to secure a few reprints of this article, for distribution among some of my friends."

—W. S. Boyce,
Assistant to Vice-President
The Colorado Fuel & Iron Corp.

"'We the Payers' is one of the best and finest articles I have seen and would like to inquire whether or not you are considering reprinting this article for distribution. Would like very much to distribute them not only to our employees but their families and many of our customers."

—H. V. Waterman, President
Hendrie & Bolthoff Mfg. & Supply Co.

"I presume you are arranging for a reprint of Col. Toulmin's series of articles. We certainly want to obtain a supply when they are available."

—Howard F. MacMillin,
President & Gen. Mgr.
The Hydraulic Press Mfg. Co.

"Would it be possible to secure six copies of technical article 'We the Payers' by Col. H. A. Toulmin?"

—A. G. Kessler, Vice-President
Farrel-Birmingham Company, Inc.

"Your first of a series of articles appearing in the July 18 issue represents, in my humble estimation, more good horse sense than anything I have ever read on that subject.
"Not only do I approve of what you said but I sincerely admire your literary style. I shall be looking forward to the succeeding articles."

—R. L. Giebel
Giebel Machine Tool Co., Inc.

"That part of the series printed in your issue of 25th July was so very good and full of meat that I had it photostated and sent it to many of my friends in the Old Country. To my way of thinking it was the cleanest cut and simplest exposition I have read anywhere of the whole beastly mess into which the easy going Anglo-Saxon civilized world has got itself today.

—A Canadian Manufacturer

PICTURED HERE is the general committee for the conference of advertising and marketing executives sponsored (at Detroit Sept. 18-20) by the National Industrial Advertisers' Association. Left to right seated: Ralph L. Wolfe, and T. B. Moule, of Seile Wolfe & Associates; Lloyd R. Vivian, Ditzler Color Co., chairman; Henry G. Doering, The Truscon Laboratories, E. C. Howell, Carboloy Co. Standing: Philip Linne, Owens-Corning Fiberglass Corp., Charles M. Gray, Chas. M. Gray & Associates; William J. Chappell, Timken-Detroit Axle Co.; A. F. Denham, Denham & Co.

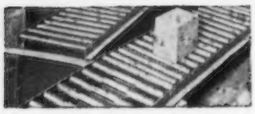
Employment in Steel Industry Up 14,000

• • • **The number employed** in the steel industry rose during July to a total of 549,000, representing an increase of 14,000 over June, when 535,000 employees were at work, according to the American Iron and Steel Institute. Employment in July was more than 20 per cent greater than in July, 1939. Payrolls in July totaled $82,215,000, against $77,388,000 in June.

Wage-earning employees in the industry received an average of 85.6c. per hour in July, as against 85.9c. in both June of this year and July, 1939. The number of hours worked per week by wage earners averaged 36.5 in July, compared with 35.9 in June and 31.0 in July of last year.

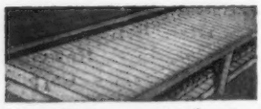
YEARLY SAVING OF $10,000!

— WITH 25% TO 50% LESS HANDLING COSTS . . .

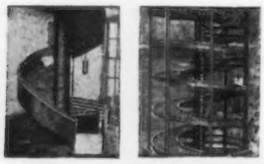


Gravity Conveyors—basis most installations. *Live Rolls*—power-operated roller conveyor.

Belt Conveyors—used for medium duty power conveying. *Vertical Lifts*—lift and lower.



Apron Conveyors—for heavier duty power conveying. Inclined and horizontal applications.



Spiral Chutes and *Roller Spirals*—"vertical" lowering by gravity.

IN the modern vernacular, *Ten Grand ain't hay!* Write for Case No. 115 and read this complete report. "Far greater saving than was expected," states the user, a machinery manufacturer. Quoting further, "We are now installing Logan Conveyors in another department."

Send for Your Copy

See this complete, factual report—it may contain an idea for you. With it we will send five more case histories, recently prepared, no obligation. Write today to:—

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Logan Conveyors

PUT *FLOW* INTO PRODUCTION

Claim of Secret G.E.-Krupp Deal Silly, G.E. Says

• • • **Officials of** General Electric Co. and Carboloy Co., a subsidiary, this week denied that the companies have knowingly violated any law, following federal grand jury indictments accusing G-E of entering a monopoly agreement giving Friedrich Krupp Aktiengesell, German muntions firm, a part in limiting American production of tungsten carbide.

A similar indictment charges G-E and four other companies with conspiring to limit competition in the glass bulb industry.

General Electric is not aware of any violations of the Wilson tariff act or the Sherman anti-trust act and will gladly submit its record for court review, Philip D. Reed, president said. A detailed answer to the government charges regarding the alleged tungsten carbide monopoly came from W. G. Robbins, president of Carboloy Co.

"The alleged claim that we have 'secret covenants' with Krupp's is ridiculous," Mr. Robbins said. "The only 'secret covenants' Carboloy has entered into are with the U. S. government and they consist of a pledge not to reveal the results of work our company has been and is doing in building up national defense.

"Furthermore, there is no secret about the manner in which we secured to this country the continuous availability of tungsten carbide. Krupp has no control whatsoever over either manufacture or distribution or prices of Carboloy metal or any other tungsten carbide produced in this country that we know of. This was specifically provided for in our license agreement.

"Our relationship with Krupp is that of any manufacturer with any inventor. Carboloy metal happens to be a German invention, although it did not become practicable for use in this country until after the expenditure of hundreds of thousands of dollars for research and development by our organization. In spite of this costly development work—in spite of the worst period of depression in the country's history—Carboloy reduced prices—

from 1930 to 1939—not once, but five times.

"As to the question of possible shortage of tungsten carbide for national defense," Mr. Robbins said, "Carboloy's new plant alone has a metal production capacity that can fill all conceivable industrial and defense demands, a capacity many times the present consumption of all tungsten carbides by industry—and from sources of raw material owned by us in the United States."

Meanwhile L. Gerald Firth, president of Firth-Sterling Steel Co., McKeesport, Pa., declared that his company looks with favor upon any action taken to remove the restrictions on manufacturers of these materials. He said:

"In our opinion, the development and use of these hard metal compositions have been very much restricted as a result of the regulations imposed by license stipulations. Moreover, authorized American manufacturers have been restrained from exporting, although there is a worldwide demand for these cutting materials.

"One striking example of the effect of these regulations," said Mr. Firth, "is found in the relatively small volume of tools made from these materials in this country as compared with the European consumption. Although the United States has the greatest amount of modern machinery adapted to the use of tools made of these cutting materials of any country in the world, their use here to date has been extremely small by comparison."

July Unemployment In Nation Gains 1%

• • • Total unemployment in the United States, after declining for four consecutive months, rose 54,000, or a little less than one per cent from June to July, according to the monthly estimate prepared by the Division of Industrial Economics of the Conference Board. The total number of employed persons was 46,882,000 in July, the highest level since October, 1937, when 47,516,000 persons were employed. In October, 1939, the best month of last year, the total stood at 46,626,000. The July total was, however, only slightly higher than that in June.

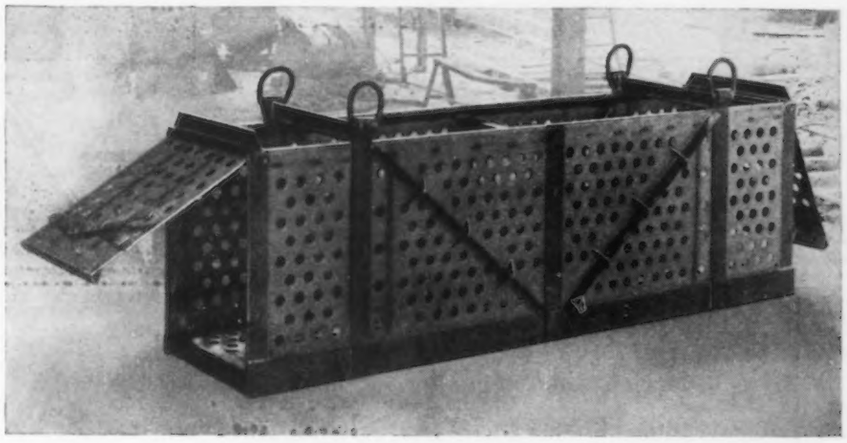
German Control of U.S. Manganese Use Denied

• • • There is no restriction upon the unlimited fabrication of magnesium metal into armaments for national defense or industrial purposes in the United States, Wiser Brown, first vice-president and general manager of the American Magnesium Corp., said this week.

Mr. Brown denied Department of Justice assertions that there is German control in this country of magnesium manufacture and fabrication through patents. American Magnesium Corp., which is owned jointly by the Aluminum Company of America and General Aniline & Film Corp., operates under American patents, many were owned by Germany companies.

The German and some of the

LIGHTWEIGHT *all-welded Crate*



made from ROD, BAR *and* PLATE

This type of design made possible by the strength and corrosion resistance of Monel . . .

Just because pickling acids and abuse in service play hob with equipment, you don't have to make it *heavy*. On the contrary, here is an example of *rugged strength* built into a *lightweight* crate:

Fabricated by Youngstown Welding and Engineering Company of Youngstown, Ohio, this crate is 11½ ft. long, 2½ ft. wide, and over 3 ft. high. Sides and ends are ¼ inch thick, bottom ⅜ inch. The whole crate is made from *standard mill forms* employing all-welded construction.

What is the metal? It's Monel . . . the alloy that resists corrosion by pickling acids and so retains its strength. Available in all standard mill forms and easily fabricated into crates and other pickling accessories, Monel assures years of service. And because Monel equipment is lighter in weight, your payloads are bigger, repair and maintenance bills smaller.

How you can take advantage of lightweight Monel construction is told in detail in "Equipment Designs for the Pickle House," "Where Monel pays its Way in Pickling," and "A Good Start to a Better Finish." This literature is *free*. Write for it today. Address:

THE INTERNATIONAL NICKEL COMPANY, INC., 67 Wall Street, New York, N. Y.

INCO MONEL **MONEL**

"Monel" is a registered trade-mark of The International Nickel Company, Inc., which is applied to a nickel alloy containing approximately two-thirds nickel and one-third copper.

To produce the highest quality of perforated metal as used in the industrial arts and for ornamentation has been the ambition and persistent endeavor of this company. The highest quality best serves the user. We are here to serve you.

ANY METAL • ANY PERFORATION

The Harrington & King PERFORATING Co.

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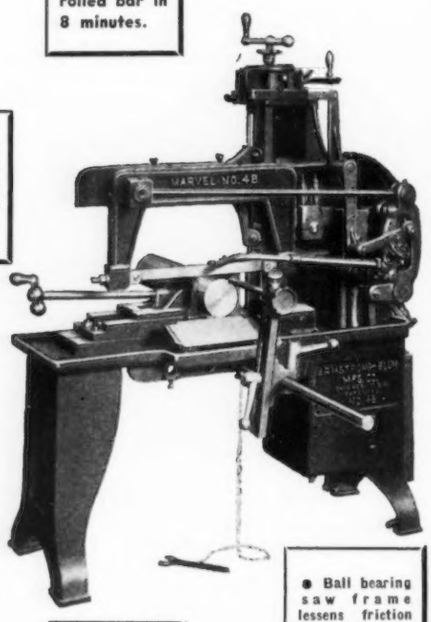
MARVEL

MARVEL 4-B High Speed Hack Sawing Machines

Unquestionably this low-priced MARVEL saw is the fastest cutting hack saw in its price class. Single-speed, two or four speed models embody ball-bearing saw frame slide, shaper action (with quick return on non-cutting stroke), screw feed, coolant pump, and sturdy vise. MARVEL 4B has a 6"x6" capacity and is ideal for partial cuts and slotting, with speed for complete cut-off exceeded only by MARVEL "heavy duty" all-ball-bearing hack saws.

SPEED
Cuts 6" cold rolled bar in 8 minutes.

• Draw out and lift return action for longer blade life.



• Ball bearing saw frame lessens friction and increases rigidity and accuracy.

• Low cost operation with High Speed performance.

MARVEL

Write for Circular

ARMSTRONG-BLUM MFG. CO.
"The Hack Saw People"
5700 Bloomingdale Ave.
Chicago, U. S. A.
Eastern Sales Office:
199 Lafayette St., New York

American patents are held by the Magnesium Development Corp., formed in 1931, by the I. G. Farbenindustrie A.G. and the Aluminum company as a magnesium patent holding company. The reason for the formation of this company was because many of the American processes were in conflict in this country with German patents. For fabrication of magnesium Dow Chemical Co. and some thirty other corporations have licenses under all patents owned by Magnesium Development Corp. These licenses are wholly unrestricted.

"This patent pooling has proved to be a fortunate arrangement," declared Mr. Brown, "because it has brought to this country not only all the German magnesium patents but the all-important know-how developed by the Germans in their intensive exploitation of magnesium. It has certainly turned out to be a one-sided bargain for the U. S., for up to this minute the Germans have not received a single dollar in royalties or patent fees in return."

Plant-Seizing Plan Attacked by Willkie

• • • Wendell L. Willkie last week attacked a movement intended to give the President the power to seize industrial plants for national defense in peacetime if the Secretaries of the War and Navy were unable to reach an agreement with the owners.

"Sovietization or socialization" of American industry would be a step nearer if the Overton-Russell amendment to the Burke-Wadsworth selective service bill were passed, Willkie said. He declared the bill would give the President peacetime power approaching a dictatorship. "There is hardly any business in the nation, because of the fact that there is now mechanized warfare, that might not be seized under this amendment," he said. "Nearly every product will be used in the defense program. Then the amendment gives the power to commandeer to those who have not been sympathetic to American business."

"I put this up to the President now and I hope that he does not answer with any quip about how Wendell Willkie loves property and he loves humanity."

Glidden to Make Pure Iron Powder

Cleveland

• • • **After seven years of** research, the Glidden Co. has perfected a process for making pure iron powder, according to P. E. Sprague, vice-president of the paint and varnish concern. Production facilities will be centered at Hammond, Ind., headquarters of the Metals Refining Co., division of the Glidden Co.

The product is obtained from special type ores, high in iron content and low in impurities and represents a triumph in the building and control of apparatus to produce powder of purity, uniform particle size and stability, which will help alleviate problems created in obtaining Swedish imports of high purity.

Removing the oxygen and purifying the ore have been obstacles facing American metallurgists. When pressed and given heat treatment to fuse the particles, the product would warp unless free of oxygen.

"It is a difficult and critical operation because of the high temperatures involved," said Mr. Syrague, who described the process as continuous, with raw material going in one end of the apparatus and the powder issuing from the other. The ore is not permitted to melt and thus emerges in powdery lumps rather than in molten form. After the extraction of oxygen the powdered iron must be kept from reuniting with the oxygen of the air. A plant has been built and is in operation at Hammond.

Youngstown Sheet & Tube Sells $10,000,000 of Serial Notes

• • • **Youngstown Sheet & Tube** Co. has completed a private sale of $10,000,000 of serial notes to eight banks and one insurance company. The notes will mature from 1941 to 1947 with interest rates varying from .5 to 2.25 per cent. Proceeds of the sale will be applied towards redemption on Oct. 1 of $10,000,000 principal amount of the company's $30,000,000 issue of convertible 4 per cent debentures, due Sept. 1, 1948.

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Quality Springs
ALL SHAPES · ALL SIZES · ALL MATERIALS

LEE SPRING COMPANY, Inc.
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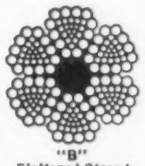
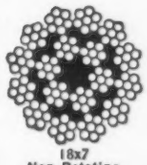
LEE-BUILT TRADE MARK SPRINGS

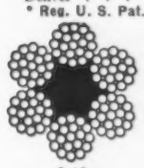
Style B Flattened Strand


"B" Flattened Strand

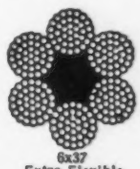
Wire Rope Center

Steel Clad


18x7 Non-Rotating


6x19 Filler Wire

6x19 Scale


6x37 Extra Flexible

8x19 Extra Flexible

You Can Depend On "HERCULES"* (Red-Strand) Wire Rope...

There is no guesswork when you use "HERCULES" (Red-Strand) Wire Rope. It is designed and built to do specific jobs better . . . safer . . . more economically. Furnished in a wide variety of constructions so as to be suitable for all purposes—each backed by 81 years of manufacturing experience and close cooperation with users.

—PREFORMED—

For maximum efficiency in Preformed Wire Rope, use Preformed "HERCULES". It is available in both Round Strand and Flattened Strand constructions.

Made Only By

A. LESCHEN & SONS ROPE CO.

Established 1857

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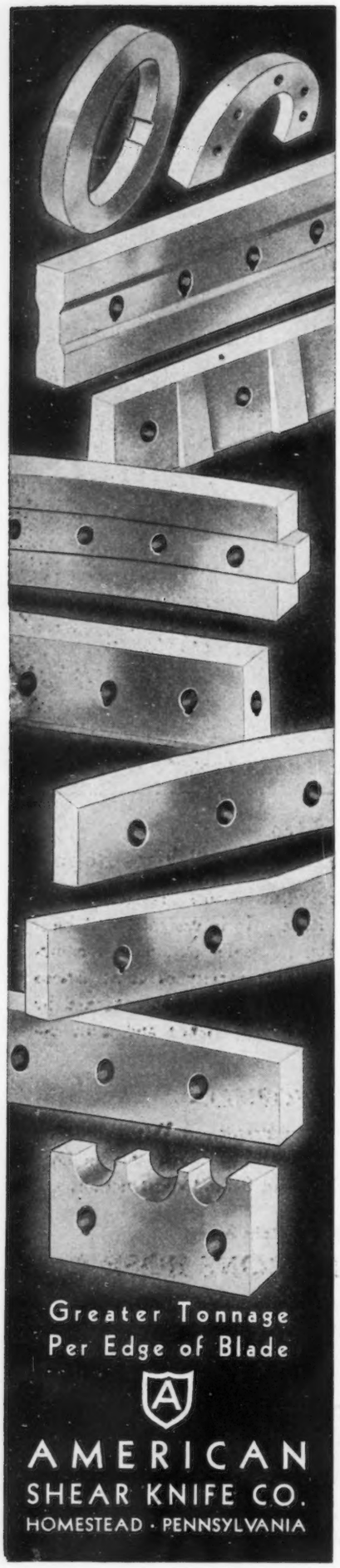

Orders Flood to Canada's Plants

Toronto

• • • **Interest in finished** and semi-finished steel is broadening at a rapid rate in the Canadian markets as a result of the increasing demand developing on war account. Officials of the various producing companies state that new bookings are pouring in at a rapid rate and on some materials contracts have been closed to the end of the year, while on most others delivery dates have been advanced to the end of October and early November on new orders. While no changes have been announced in price lists current quotations generally are firm. On long term contracts producers are stipulating that price will be made known at time of delivery, thus protecting themselves.

The Department of Munitions and Supply, acting for the Canadian and British governments, is placing orders for munitions, ordnance, machinery, tools, aircraft supplies, mechanical transport, guns, and various other equipment and for building projects of various types, at a rate exceeding $2,500,000 daily and there is no indication of early suspension of these activities. Approximately $1,000,000,000 in new orders for Canada and Great Britain still have to be placed between now and the beginning of April, 1941.

Sheets and plate are the most active materials on the steel list at present. According to local steel interests producers are booked on sheets to the end of the year and delivery dates on new orders are early in 1941. Plate demand has been exceedingly heavy of late due to Canada's big shipbuilding program which is being further increased by new awards running into millions of dollars. Canadian plate producers have been booked solid for many months and their output will be taken fully well into 1941. In addition the Steel Co. of Canada, Ltd., Hamilton, is engaged in installing a new plate mill which is expected to be completed and in production next February. This, to some extend, will aid in the supply of plate for shipbuilding, tanks and armored truck production. In the meantime, however, most of the plate demand is

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I INSIST ON GOOD DESIGN

Both of us get what we want in PARKER-KALON Cold-forged Products

PARKER-KALON *Cold-forged* Socket Screws, Wing Nuts, Cap Nuts and Thumb Screws meet the requirements of even the most critical men who specify and use such products. Unmatched in accuracy, strength, design and finish, these *cold-forged* products are demanded by thousands upon thousands of users. Try them. Samples and prices on request, without obligation.

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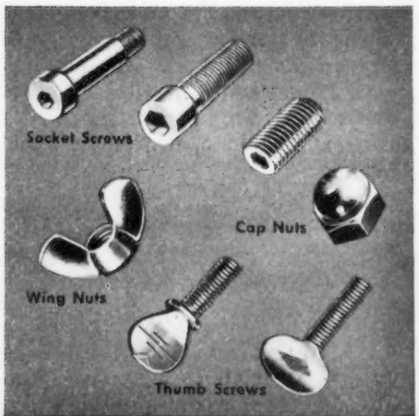


PARKER-KALON
Cold-forged
SOCKET SCREWS WING NUTS
CAP NUTS THUMB SCREWS
SOLD ONLY THROUGH REPUTABLE DISTRIBUTORS

Another Expansion for Warner & Swasey

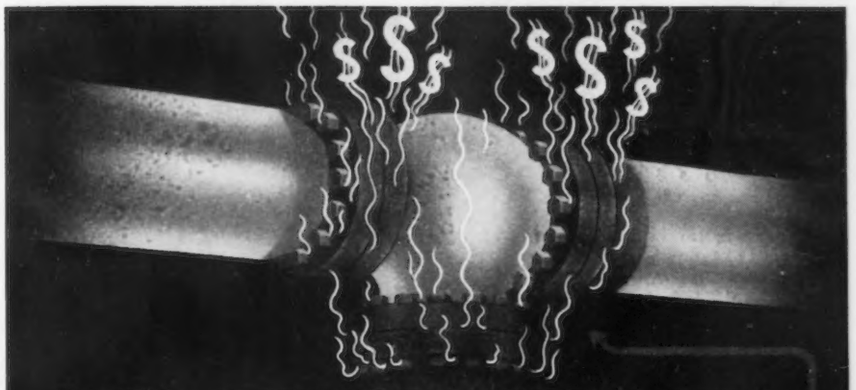
Cleveland

• • • **The third expansion** of the Warner & Swasey Co. in four months has just been started here. The three add 110,000 sq. ft. to the turret lathe plant and represent a cost of about $600,000. In the latest job, two buildings will be constructed. One will be 100 by 300 ft., the other 100 ft. square. They will be of brick and glass block with steel frame and concrete floors. Also to be constructed is a 21,000-sq. ft. loading platform. Alterations will be made to the top floor of the old building to make more engineering department space.

being taken care of by imports from the United States.

Information also is received that the Canadian automotive industry has been taking large tonnages of spring steel recently and other large orders for steel have been placed for truck and car production which is getting underway on new 1941 models. Wire and wire products have come into more active demand recently due to heavy placing of fencing orders for government works, factories and other properties to prevent sabotage. Manufacturers of guns and munitions now are getting into full swing on big production programs and call for steel from these sources is increasing rapidly.

Canadian primary steel producers now are operating at their maximum capacity. Only one blast furnace remains out of blast in Canada, while all open hearth furnaces now are said to be in operation, including a number of old furnaces that had been down for years and were considered almost worthless for iron production. Canada's steel industry as a whole is maintaining production at a rate never before equalled. Despite this high production rate mills in this country still are behind in meeting demands with the result that imports running about 80,000 tons per month are necessary from the United States. One of the drawbacks to further production of steel is the problem of obtaining raw materials, pig iron and scrap.



STOP THESE HIDDEN LEAKS THAT *WASTE YOUR DOLLARS...*

Hundreds of Plants effect Big Savings with

Carey INDUSTRIAL PRODUCTS

One pair of bare, 10-inch flanges at 350°F., waste one ton of coal per year.

One foot of bare, 10" steam pipe, heated to 700°F., can cost you heavy heat loss. Figuring steam cost at 30c per million B.T.U., insulation 3½" thick, shows an annual saving of $25.50 per foot of pipe.

MANY industrial plants have hidden profit leaks in the form of waste in production, or excessive overhead. While these leaks may be small in themselves, they may add up to a very costly total.

Heat loss, through inadequately insulated pipe, is one of the most common of these hidden profit leaks. Scientific tests show, and hundreds of installations prove, that from 70% to 98% of this loss may be saved by correct insulation.

Fortunately for industry, there is a practical way, not only to find these wastes, but also to eliminate them. The Carey organization is equipped to help you uncover the profit leaks in your plant. A phone call or letter to our nearest branch, will bring a representative.

THIS BOOK TELLS HOW TO REDUCE PROFIT LEAKS

Guides you in making a complete check of your plant from roof to basement . . . tells where to look for waste in power production and in building maintenance . . . how to stop this waste. This book should be on the desk of every factory executive. It is yours for the asking. Send for your copy today, address Dept. 6.

INDUSTRIAL BUILDING PRODUCTS OF
ASPHALT—ASBESTOS—MAGNESIA

Roofing . . . Siding . . . Flooring . . . Insulations . . . Roof Coatings and Cements
Waterproofing Materials . . . Expansion Joint . . . Asbestos Paper and Millboard

THE PHILIP CAREY COMPANY • Lockland, Cincinnati, Ohio
Dependable Products Since 1873
BRANCHES IN PRINCIPAL CITIES

ARMSTRONG

SETTING-UP TOOLS

There is no better way to take profits from overhead than to provide a complete set of ARMSTRONG Setting-Up Tools for your planers, shapers, boring mills, milling machines, band saws, and grinders.

Save Machine and Man Hours wasted while operators pick over the scrap pile seeking setting-up material or "doping-out" makeshift set-ups.

Reduce Loss thru spoilage resulting from poor, inaccurate, or insecure set-ups.

Prevent Accidents caused by inadequate strapping or slippage.

The ARMSTRONG Setting-Up Tool Line includes T-slot Bolts, Non-Skid Vertical and Bracing Jacks, Planer (Swivel Head) Jacks, and 6 types of Drop Forged Strap Clamps, all in several sizes.

Write for Circular.

ARMSTRONG BROS. TOOL CO.
"The Tool Holder People"
309 N. Francisco Ave., Chicago, U.S.A.
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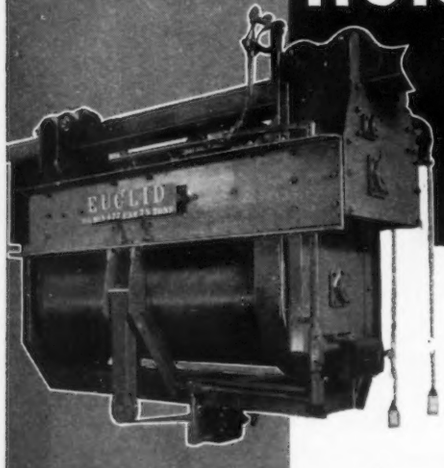
Buy ARMSTRONG TOOLS from your Supply House



HOISTS *for every purpose*

BUILT TO ONE HIGH STANDARD

HERE is a compact hoist with a 240 foot lift, for handling a pump at the bottom of a shaft 240 feet below the level of the ground.

Its design presented unusual problems because of limited headroom and exacting requirements as to hook approaches, etc.

The Euclid organization has been solving problems of this kind for a third of a century. This experience is at your disposal. Tell us your problem and we will work with you.

THE EUCLID CRANE & HOIST CO.
1361 CHARDON RD. . . . EUCLID, OHIO

EUCLID *CRANES & HOISTS*

Chicago Awaits Army Contracts Totaling $40,000,000

Chicago

• • • **Immediately following** approval by the Senate of the excess profits tax and plant amortization bill, Army ordnance contracts to the amount of $40,000,000 will be let in the Chicago area, according to a statement last week by Col. Donald Armstrong, executive officer of the Chicago office of the ordnance procurement division of the War Department. It was indicated that orders for perhaps $160,000,000 of additional ordnance would follow within the next ten months from the Rock Island arsenal and other procurement departments.

Contractors Organize At Birmingham

Birmingham

• • • **An organization** with the announced purpose to materially reduce cost of construction, residential and commercial, has been set up by 52 building contractors here. The cooperative, to be known as the Cooperative Builders Association, proposes to establish central headquarters and purchase material through a central purchasing agent in carload lots, Kenneth T. Perrine, treasurer, said. At the same time, Perrine said, the cooperative will underwrite financing of building projects.

Allegheny Ludlum Pays 25c. on Common Stock

Pittsburgh

• • • **The board of directors** of the Allegheny Ludlum Steel Corp., Pittsburgh, declared a dividend of 25c. a share on the common stock, payable Oct. 1 to stockholders of record as of Sept. 11.

Reich Seizes British Ore Mines in Norway

• • • **The Dunderland Mines** in Norway, which formerly produced 150,000 tons of iron ore annually, have been taken over by the Hermann Goering Works. The mines are owned by the Dunderland Iron Ore Co., London.

Arnold is Machine Tool Controller for Canada

Ottawa

• • • **Thomas Arnold,** chairman of Manitoba Steel Foundries, Ltd., Winnipeg, Man., has been appointed machine tool controller for Canadian industry. The object of the appointment is to eliminate the most serious bottleneck in Canada's war effort. Mr. Arnold, given wide powers, will have control over the production and purchase of tools, issuing of export or import licenses and may take any steps required to provide tools for war purposes. He also is president of the Citadel Merchandising Co., Ltd., a government-owned corporation engaged in augmenting the supply of machine tools both from abroad and from domestic sources.

Standard Steel Spring Co. Has New Tin Plate Process

• • • **Standard Steel Spring Co.** reports development of a new process of manufacturing tin plate by electrolytic deposition first of nickel and then of tin on black plates.

W. F. Rockwell, Standard Steel Spring chairman, said that the new process, substituted for the hot dip method of manufacturing tin plate, will extend one year's supply of tin over four years, a fact important to national defense.

Several steel companies have been licensed to utilize Standard Steel's "Corronizing" process, developed more than a year ago.

Steel Wages Up at Birmingham

Birmingham

• • • **A 5c. increase** in the hourly minimum wage rate, to comply with requirements of the Walsh-Healey Act, was put in effect here Sept. 1 by Republic Steel Corp., Woodward Iron Co. and Sloss-Sheffield Steel & Iron Co.

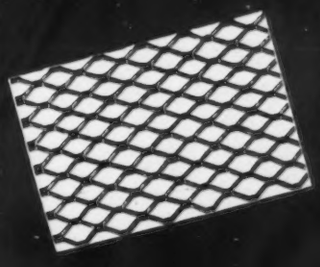
The increase does not apply to coal miners, already receiving wages higher than the new minimum for this area of $3.60 a day.

The wage advance is estimated to affect close to 3000 workers and to increase the district's payrolls by $6,000 a week.

SUPERIOR

Galvanized Sheets

TITE AND EXTRA TITE COAT



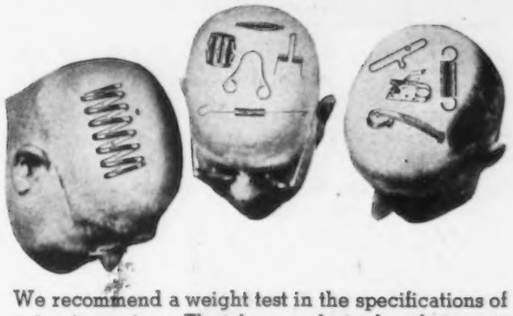
These sheets will answer many needs in industry for quality sheets that form smoothly without fracture or flaking of coating. Superior Sheets, known wherever coated sheets are used, include: Superior Galvannealed, Checker Coat, "Super Metal," Tite and Extra Tite Coats, Plain Galvanized and long terne.

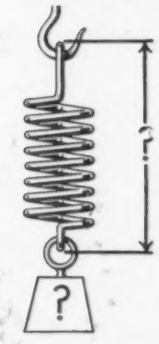
THE SUPERIOR SHEET STEEL COMPANY
Canton, Ohio
Division of Continental Steel Corp., U. S. A.

THE SUPERIOR SHEET STEEL CO. TRADE MARK REGISTERED CANTON, O.

the practical side of Springmaking — BY DUNBAR

"We don't know all about Springs ... but all we DO know is Springs"





We recommend a weight test in the specifications of extension springs. The tolerance desired on that specification will tell whether no test, a spot test or 100% test is necessary. As this factor can vary the cost of a spring, it is plain that easy tolerances can save you money.

There are other savings in style of end, correct material, finish, method of assembly, proper initial tension.

You may be paying for spring quality you don't need—or you may find that a *better* spring can bring you savings. It's up to a good springmaker to help you find out.

FOR PRACTICAL SPRING ADVICE, CALL ON

Dunbar Bros. Co., Bristol, Conn.

DIVISION OF ASSOCIATED SPRING CORPORATION

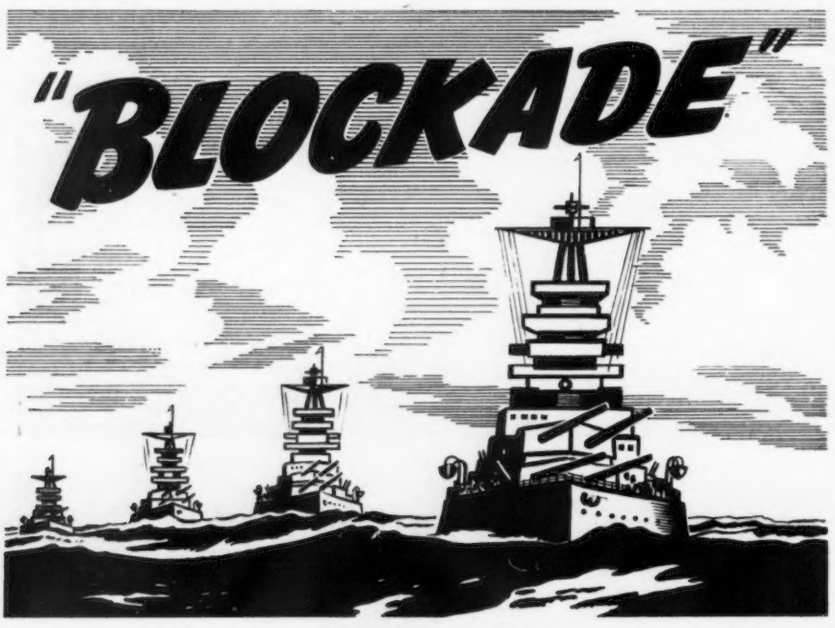
"Quality Springs Since 1845"

Jokers Seen In Tax Amortization Bill

Washington

• • • **With brief hearings** begun on Tuesday of the present week before the Senate Committee on Finance, prominent Senate leaders predicted that because of alleged "jokers" that would penalize industry, the intricate 96-page excess profits amortization bill that was quickly jammed through the House last Thursday will be rewritten. They did not disclose what they said were the "jokers," but charged that they were drafted by New Deal Treasury experts. The House Committee on Ways and Means was criticized for giving inadequate consideration to the legislation. Under a gag rule the bill was subject to what was described as the most superficial discussion. Nor, it was pointed out, was its many provisions understood by more than a handful of House members. Claims were made that the House Committee had "passed the buck" to the Senate.

The bill has three features. It provides taxes on rearmament profits, amortization over a five-year period on construction of defense facilities and suspension of the Vinson-Trammel act limiting profits to 8 per cent on ship and airplane contracts.



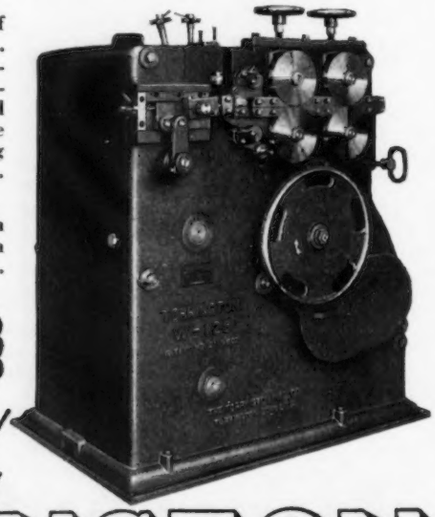
... AGAINST REJECTS!

If you want springs that stay sold, springs that are produced speedily and, above all, accurately . . . with fewer rejects . . . then you NEED Torrington Spring Machines.

Torrington Spring Machines are of extra-heavy, rigid construction . . . compact design . . . with easily adjusted and conveniently located controls. Timken bearings are used throughout. Springmakers everywhere are discovering that Torrington Spring Machines meet their every demand . . . exactly.

Investigate NOW what Torrington Spring Machines can do for YOU in stepping up production, accuracy . . . and PROFITS.

SINCE 1937 TORRINGTON HAS BUILT AND SOLD MORE AUTOMATIC SPRING COILING MACHINES THAN ALL OTHER MANUFACTURERS COMBINED.



Spring Making Machines by

TORRINGTON

THE TORRINGTON MANUFACTURING CO. of TORRINGTON, CONNECTICUT

Modified "Draft Industry" Measure is Approved

Washington

• • • **Assuming the proportions** of a national political issue a "draft industry" amendment was adopted by the House Committee on Military Affairs on Tuesday, as a modification of a stronger Overton-Russell amendment previously included by the Senate in the conscription bill. The House committee amendment was adopted by the narrow vote of 12 to 11 just prior to taking up the conscription bill in the lower branch of Congress.

The House amendment was sponsored by Representative Smith, democrat of Connecticut. It provides that when the War or Navy Department cannot come to terms with a private plant in connection with defense orders the plant would be rented to the government. It is thus similar to the 1916 act providing for leasing of plants to the government.

J. & L. Miners Idle In Outlaw Strike Return

Pittsburgh

• • • **Four thousand** Jones & Laughlin Steel Corp. miners who had been on a two-week outlaw strike, returned to work early this week. Grievances will be taken up in accordance with the contract between company and union. Both union and company officials branded the strike as a contract violation.

Carboloy Reduces Prices Substantially

Detroit

• • • **Mass production** of a standardized line of Carboloy cutting tools, designed to cover 80 to 90 per cent of all applications for cemented carbide tools, was announced this week by Carboloy Co., Inc.

The introduction of this simplified line of tools—comprised of five styles in three different grades—together with economies resulting from mass production, has made it possible, according to the announcement, to price these complete tools well below comparable tools in the past, a typical new "standard" tool at only $1.85 comparing with tools previously costing $5.84 in lots of one. In quantities of 50 or more, the same tool now costs only 90c.

Inception of such a manufacturing program and economies resulting from greater production efficiency in Carboloy's new $1,000,000 plant have made possible, according to W. G. Robbins, Carboloy president, a further price reduction—the sixth since 1929—on cemented carbide metals, thereby also effecting price reductions on other Carboloy products, including special tools and tool bits, dies, wear-resisting inserts, etc.

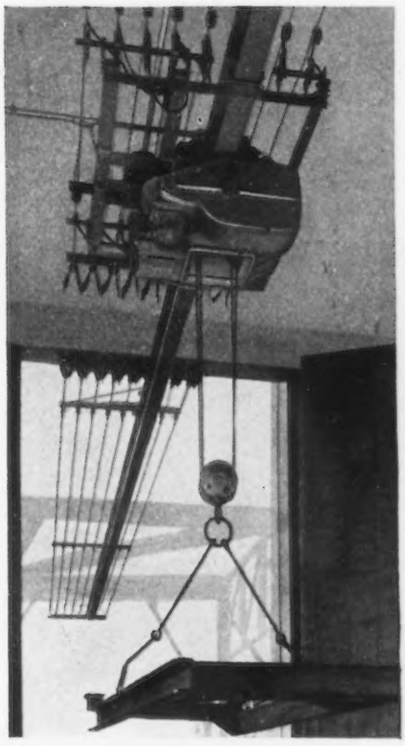
Steckel Litigation Ended by Agreement

Pittsburgh

• • • **Patent litigation** which has been in the courts off and on since 1923 with varying defendants was settled on Tuesday of this week when Carnegie-Illinois Steel Corp. announced that an agreement with the Cold Metal Process Co., Youngstown, Ohio, had been reached, covering the so-called Steckel patents for equipment and processes for rolling in the cold reduction of steel products.

It is believed that about $3,850,000 was involved in the settlement to cover past and future royalties. By the agreement Carnegie-Illinois and other steel corporation subsidiaries are licensed to operate under the patents under royalties set out in the agreement. It was also agreed by Cold Metal Process Co. that equally favorable terms and royalties will be available to other steel companies.

A new idea in CONTROLLED MATERIAL-FLOW with R & M LOW HEADROOM HOISTS



From outdoor yard storage to second-floor machine shop in *one* operation . . . controlled by *one* man . . . from *one* point. That's the sort of time-saving, cost-reducing material-flow you can get with the new R & M Low Headroom electric hoist and motor-driven trolley, as illustrated here.

It has a hoisting speed of 20 ft. per min. and trolley travel speed of 100 ft. per min. In this installation every foot of material movement is controlled from a station inside the second-floor door.

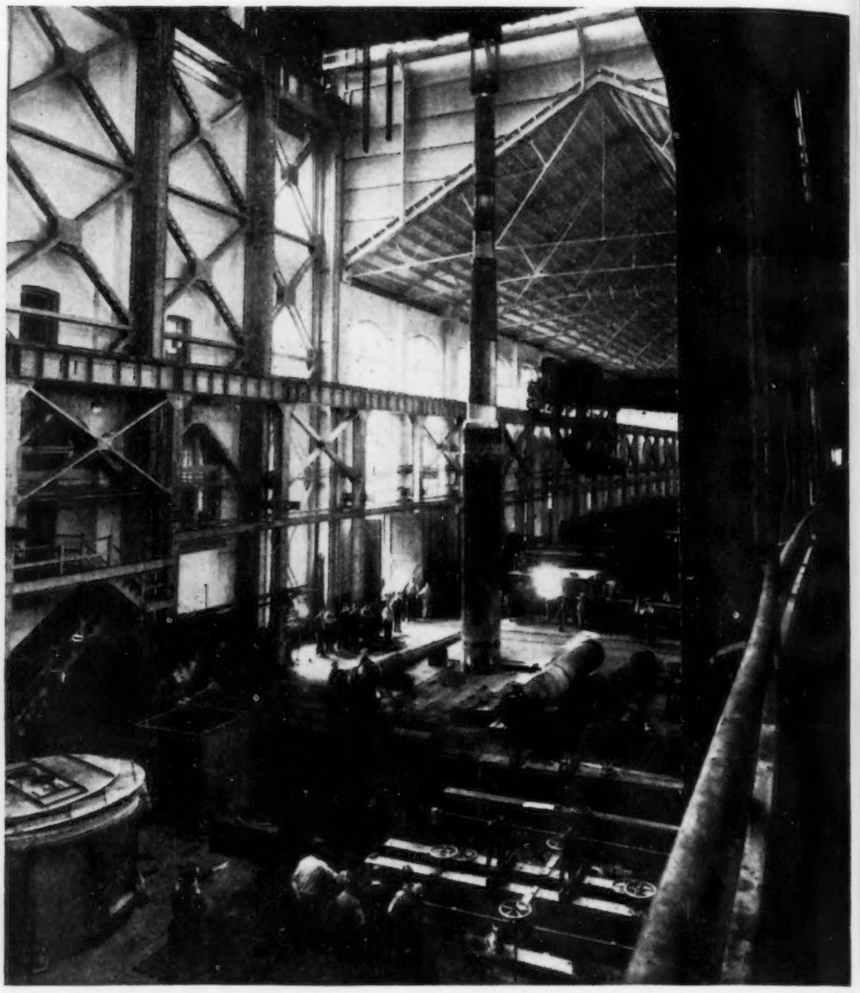
This is the R & M answer to one man's problem. Controlled material-flow with R & M Low Headroom Hoists may be your solution, too. Just give us the facts, briefly, and we'll be glad to talk it over with you.

All R & M Electric Hoists are of compact, low-headroom design, giving you 1' 6" to 2' 6" more usable space than would hoists of conventional design.

ROBBINS & MYERS, Inc.

HOIST & CRANE DIVISION • SPRINGFIELD, OHIO

Uncle Sam's Arsenals Speed Up Production For Nation's Defense



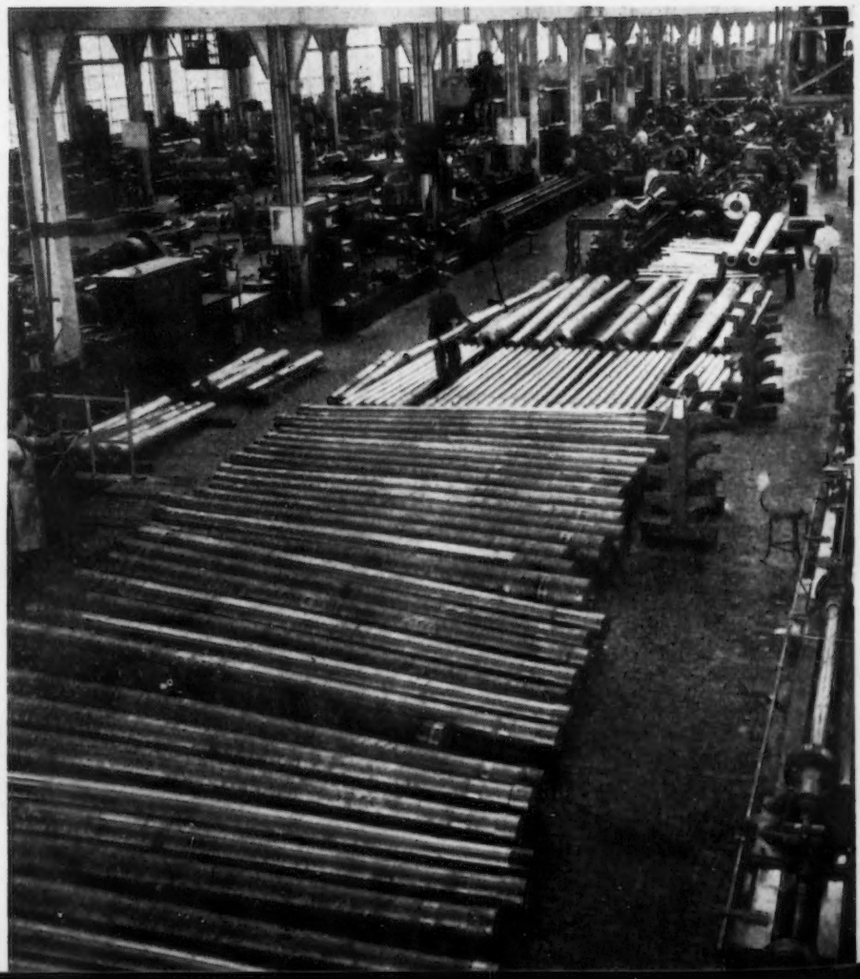
GLORIFIED HAND grenades, the new 16 mm. mortar field guns (above), are shown being inspected at the Watervliet Arsenal, Watervliet, N. Y.

•

WORKMEN READY to lower a 16-in. gun mold into the shrink pit at Watervliet are shown at the top right. The tube on the ground is also part of the mold and will be added to it. This gun takes a year to build and shoots a 2400-lb. projectile 21 miles.

•

ARSENAL EMPLOYEES are assembling 8-in. guns in the photograph at the lower right. Scenes like this may be found at various government plants where equipment vital to defense is being produced.



Photos by Wide World

Government Contracts

Washington

• • • **Federal contracts** for iron and steel products as reported for the week ended Aug. 24 by the Labor Department's Public Contracts Division total $9,153,499. For the same period contracts aggregated $1,917,542 for non-ferrous metals and alloys and $1,060,548 for machinery. Details follow:

Iron and Steel Products

American Type Founders Sales Corp., Washington, D. C., steel equipment, $15,796.
Pennsylvania Forge Corp., Philadelphia, gun forgings, $103,217.
Crucible Steel Co. of America, New York, gun forgings, $882,300.
The Midvale Co., Philadelphia, gun forgings, $2,282,820.
Worthington Pump & Machinery Corp., Harrison, N. J., tanks, feed, $18,654.
Crane Co., Washington, D. C., steel pipe, $23,297.
Inland Steel Co., Chicago, structural steel, $13,076.
Budd Wheel Co., Detroit, projectiles, $1,198,339.
American Forge Division of The American Brake Shoe & Foundry Co., Chicago, sheet forgings, $624,000.
Pittsburgh Steel Co., Pittsburgh, fence, $35,418.
American Car & Foundry Co., New York, parts, $29,580.
Colt's Patent Fire Arms Mfg. Co., Hartford, Conn., pistols, $56,737.
National Pneumatic Co., Inc., New York, mortars & mounts, $10,312.
Reeves Steel & Mfg. Co., Dover, Ohio, buckets, $14,241.
Jackes-Evans Mfg. Co., St. Louis, arrestors, $32,038.
Hibbard Spencer Bartlett & Co., Chicago, pulaski tools, $9,615.
The Midvale Co., Philadelphia, liner forgings, $74,740.
Crucible Steel Co. of America, New York, gun forgings, $208,536.
National Forge & Ordnance Co., Washington, D. C., liner forgings, $17,479.
Erie Forge Co., Erie, Pa., liner forgings, $60,721.
Pennsylvania Forge Corp., Philadelphia, liner forgings, $40,118.
Bethlehem Steel Co., Bethlehem, Pa., liner forgings, $97,162.
Crucible Steel Co. of America, New York, gun forgings, $458,458.
National Tube Co., Washington, D. C., steel tubing, $28,415.
Sheffield Steel Corp., Kansas City, steel, rivet, $41,959.
Pittsburgh Steel Co., Pittsburgh, wire strand, $31,800.
LaSalle Steel Co., Chicago, cold drawn steel, $126,608.
Mergenthaler Linotype Co., Brooklyn, telescope mounts, $545,591.
National Tube Co., Pittsburgh, forgings, $52,276.
Charles J. Dickgiesser & Co., Derby, Conn., platform assemblies, $36,852.
Wm. Scrimgeour, Washington, D. C., parts for field ranges, $60,675.
Lukens Steel Co., Coatesville, Pa., steel plates, $28,944.
Inland Steel Co., Chicago, steel sheet, $39,579.
The American Rolling Mill Co., Middletown, Ohio, steel, $60,988.
Carnegie-Illinois Steel Corp., Washington, D. C., steel, $76,078.
Pittsburgh Steel Foundry Corp., Glassport, Pa., rack castings, $32,600.
Bethlehem Steel Co., Bethlehem, Pa., shell, $26,344.
York Safe & Lock Co., York, Pa., gun carriages, $794,300.
Chrysler Airtemp Sales Corp., Dayton, Ohio, cabinets, field range, $235,000.
Parish Pressed Steel Co., Reading, Pa., cabinets, field range, $278,750.
Stewart-Warner Corp., Indianapolis, fire units, field range, $237,480.

Non-Ferrous Metals and Alloys

Thompson Products, Inc., Detroit, fuze adapters, $121,282.
Standard Pressed Steel Co., Jenkintown, Pa., heads for primer, $65,730.
Chase Brass & Copper Co., Inc., Waterbury, Conn., cartridge cases, $1,353,505.
American Brass Co., Waterbury, Conn., cartridge cups, $155,353.
Aluminum Cooking Utensil Co., New Kensington, Pa., food containers, $47,505.
American Brass Co., Waterbury, Conn., copper bands, $27,149.
Gorham Co., Providence, silver-plated ware, $38,053.
Phelps Dodge Refining Corp., New York, electro. copper, $54,700.

Machinery

Watson-Stillman Co., Rosele, N. J., hydraulic equipment, $52,832.
The Osgood Co., Marion, Ohio, crawler crane, $16,990.
Harris-Seybold-Potter Co., Cleveland, turning machine tool, $15,000.
Wisconsin Axle Division, The Timken-Detroit Axle Co., Oshkosh, Wis., transmission, parts, $26,448.
Federal Machinery Sales Co., Chicago, punch press, $13,407.
The Bullard Co., Bridgeport, Conn., boring mills, $136,614.
E. L. Essley Machinery Co., Chicago, metal working, machine & honing equipment, $17,822.
Neff Kahlbusch & Bissell, Inc., Chicago, shears, $13,811.
Marshall & Huschart Machinery Co., Chicago, boring machines & equipment, $204,329.

(Continued on next page)

Steel Exports in July Equal 14% of Mill Output

Washington

• • • **Rising for the third** consecutive month, exports of iron and steel products, exclusive of scrap, aggregated 707,809 gross tons in July, a gain of 90,131 tons over June, according to the Metals and Minerals Division, Department of Commerce. Compared with the corresponding month of 1939, the increase was 544,211 tons. July, 1940, exports represented 14.2 per cent of total ingot production for that month.

Exports in the first seven months of 1940 amounted to 3,478,423 tons, more than trebling outgoing shipments of 1,089,873 tons in the corresponding period of last year.

Taking 376,066 tons, United Kingdom continued to be the leading export market in July. Canada ranked second with 69,969 tons, followed by Argentina, 37,851 tons, and Brazil, 21,207 tons. Union of South Africa took 20,092 tons, China, 19,427 tons and Japan, 17,025 tons.

Ingots, blooms, billets, etc., constituted 39 per cent, or 273,862 tons, of the July exports, the United Kingdom taking 261,292 tons of raw and semi finished material.

Pig iron exports were 70,790 tons, of which 57,995 tons went to the United Kingdom. Shipment of plain black steel sheets totaled 41,021 tons, of which 18,393 tons were taken by Canada. Merchant bar exports were 39,651 tons, of which United Kingdom took 13,757 tons. Plain plate exports were 33,840 tons, while shipments of tin plate were 30,078 tons. Plain structural shape exports were 24,527 tons.

Exports of scrap in July totaled 327,129 tons, about 9000 tons over June. In the first seven months of 1940 scrap exports were 1,808,234 tons, compared with 2,139,018 in the corresponding period of 1939.

United Kingdom was the leading foreign buyer of scrap in July, taking 140,365 tons, followed by Japan, 113,926 tons and Canada, 57,104 tons.

Cincinnati Milling Machine & Cincinnati Grinders, Inc., Cincinnati, grinding machines, $17,003.
Brown & Sharpe Mfg. Co., Providence, grinding machines, $25,251.
Kearney & Trecker Corp., Milwaukee, Wis., milling machines, $15,680.
American Laundry Machinery Co., Cincinnati, laundry equip., $10,881.
American Laundry Machinery Co., Cincinnati, washers, $28,489.
Pratt & Whitney Div. Niles-Bement-Pond, Co., West Hartford, Conn., drilling machines, $38,008.
Robbins & Myers, Inc., Springfield, Ohio, hoists, $12,627.
Ajax Mfg. Co., Cleveland, forging, bolt & rivet machines, $21,768.
T. L. Smith Co., Milwaukee, tilting mixers, $34,185.
Sebastian Lathe Co., Cincinnati, lathes, $23,200.
Lloyd & Arms, Inc., Philadelphia, drilling machine, $10,340.
Food Machinery Corp. Peerless Pump Division, Los Angeles, pumping units, gasoline engines & gear units, $12,876.
Henry Prentiss & Co., Inc., Boston, radial drills, $76,134.
Stedfast & Roulston, Inc., Boston, engine lathes, $19,288.
Gisholt Machine Co., Madison, Wis., turret lathes, $29,316.
Harnischfeger Corp., Milwaukee, bridge, crane, $22,625.
Foote-Burt Co., Cleveland, broaching machine, $12,875.
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn., gaging machines, cartridge, $30,000.
Austin-Hastings Co., Inc., Cambridge, Mass., hydraulic planer machine, $35,712.

War Department Awards

Brown & Sharpe Mfg. Co., Providence, milling machines, $134,220.
Gisholt Machine Co., Madison, Wis., lathes, $29,316.
Cincinnati Milling Machine & Cincinnati Grinders, Inc., Cincinnati, milling machines, $148,890.
Williams Lumber Co., Columbus, Ga., temporary buildings, Ft. Benning, Ga., $2,079,790.
Ford J. Twaits-Morrison-Knudsen Co., Inc., Los Angeles, temporary housing, Camp Ord, Cal., $2,731,000.
Whittenburg Construction Co., Louisville, temporary housing, Fort Knox, Ky., $473,000.
Scovill Mfg. Co., Waterbury, Conn., ammunition parts, $288,200.
J. G. Brill Co., Philadelphia, artillery, $148,060.
Struthers Wells-Titusville Co., Titusville, Pa., forgings, $36,078.
National Forge & Ordnance Co., Irvine, Pa., forgings, $39,685.
Crucible Steel Co. of America, New York, forgings, $40,587.
Barnard Aviation Equipment Co., Inc., Ashley, fire control equipment, $90,898.
Austin-Hastings Co., Inc., Cambridge, Mass., planer machines, $35,712.
Thompson Grinder Co., Springfield, Ohio, grinding machines, $46,200.
National Builders, Inc., Minneapolis, recruit reception center, Ft. Snelling, Minn., $114,700.
Aluminum Cooking Utensil Co., New Kensington, Pa., equipment for field ranges, $358,785.
Kirk & Blum, Cincinnati, equipment for field ranges, $250,000.
T. E. Ritter Co., Norfolk, Va., reinforced concrete runways, Langley Field, Va., $268,710.
R. G. LeTourneau, Inc., Peoria, Ill., road construction equipment, $78,444.
Caterpillar Tractor Co., Peoria, Ill., road construction equipment, $154,126.
The Armco International Corp., Middletown, Ohio, road construction equipment, $55,710.

Navy Contracts

The Electric Products Co., Cleveland, welding control panels, $33,882.
Struthers Wells-Titusville Corp., Titusville Forge Division, Titusville, Pa., propeller shafts. $82,362.
The Milton Mfg. Co., Milton, Pa., steel nuts, $63,143.
J. J. Agutter, Seattle, Wash., improvement of fire protection system, naval ammunition depot, Puget Sound, Wash., $85,618.
I. J. White Co., New York, bakery equipment, naval air station, Jacksonville, Fla., $22,985.
Duke Mfg. Co., St. Louis, kitchen equipment, naval air station, Jacksonville, Fla., $62,972.
Pathgeb-Walsh, Inc., Port Chester, N. Y., replacement of two buildings, naval ammunition depot, Iona Island, N. Y., $51,558.
Crane Co., Washington, D. C., steel gate valves, $32,768.
Kearney & Trecker Corp., Milwaukee, milling machines, $57,968.
Sandusky Foundry & Milling Co., Sandusky, Ohio, shaft sleeves, $119,979.
Reed-Prentice Corp., Worcester, Mass., lathes, $111,670.
Cincinnati Milling Machine & Cincinnati Grinders, Inc., Cincinnati, milling machines, $38,485.

30,000 Plane Engine Orders for Wright

Washington

Contracts for 687 combat planes were announced last Friday by the War Department which simultaneously reported an agreement for the production of 20,000 airplane engines by the Wright Aeronautical Corp. and 14,000 propellers by the Curtiss propeller division of the Curtiss-Wright Corp. This agreement involved the largest number of airplane engines yet negotiated for, exceeding by 3000 the number of Pratt and Whitney engines which the navy had previously announced will be manufactured by the United Aircraft Corp. for the army and navy requirements for the fiscal years 1941 and 1942. The War Department agreement for the production of the 20,000 Wright engines also covers requirements for the army and the navy for the same years.

The terms of the War department agreement follow in general the policy worked out by the National Defense Advisory Commission. Like the Navy Department agreement, calling for $7,000,000 worth of machine tools, the War Department arrangement contemplates that the buildings and the machine tools required will be provided by the corporations at their own expense. Also like the Navy Department, the War Department emphasized the spirit of cooperation shown by business.

The Lockheed Aircraft Corp., Burbank, Cal., has been awarded a contract for 140 interceptor pursuit planes at a cost of $30,278,782 and the Boeing Aircraft Co., Seattle, Wash., has been awarded a contract for 277 heavy bombers at a cost of $70,449,955.

Navy Cancels its Steel Schedule

Washington

• • • **The Navy Department** has cancelled its semi-annual steel schedule calling for approximately 117,600 tons of material. The department is conferring about a revised schedule and probably will readvertise in the near future for bids.

Personals

Change is inevitable in progressive Industry. Change is constant.

• **George W. Rooney** has been named comptroller of the United States Steel Corp. of New Jersey, effective Oct. 1, to succeed Adolph W. Vogt, who died in November, 1939, according to the announcement made by Irving S. Olds, chairman of the board. Mr. Rooney has been associated with United States Steel subsidiaries since 1930. He has had a broad experience in the entire field of accounting, extending over a period of 25 years. He was appointed comptroller of the National Tube Co. in 1938 and came to the corporation from that post. Mr. Rooney was born in Pittsburgh in 1894 and was educated in the public schools of Pittsburgh, and the University of Pittsburgh. His first business experience was in the accounting department of H. J. Heinz Co., and he served from 1912 to 1917 in a similar capacity for the Board of Public Education, Pittsburgh. Mr. Rooney served 14 months in France during the World War as a sergeant of Company A 315th machine gun battalion, 80th division. After eight years with Scott-Boschert & Co., Pittsburgh, certified public accountants, specializing in auditing and taxes, Mr. Rooney joined the Oil Well Supply Co., United States Steel subsidiary, in 1926, and served as auditor from 1932 to 1938.

• **James Campbell Hodge** has been elected as vice-president and director of the Wellman Engineering Co., Cleveland, Ohio.

Dr. Hodge received his B.S. degree from Case School of Applied Science in 1923, majoring in metallurgy. For four years afterwards he was associated with Bennett & Christensen, consulting chemists and metallurgists serving foundries in Ohio and Indiana.

He joined the Babcock & Wilcox Co. in Barberton, Ohio, in 1927, as a metallurgist, where he developed and perfected the process of welding used by Babcock & Wilcox Co. in the welding of boiler drums and other important constructions, such as the power penstocks for Boulder Dam. In 1932 he was appointed chief metallurgist of the Babcock & Wilcox Co.

Dr. Hodge is widely known in industry. He has served on technical committees of the American Society for Testing Materials, on the Boiler Code Committee of the American Society of Mechanical Engineers, the Welding Research Committee of the Engineering Foundation, the American Welding Society and the American Petroleum Institute.

• **Warner G. Tilsher** has been appointed factory manager of the Taylor-Winfield Corp. Mr. Tilsher has been active here and abroad in the development and manufacture of aircraft, streamline trains and other light weight structures fabricated by resistance welding. He has assisted in the organization and management of several aircraft plants. In 1931 he designed the first airplane completely fabricated by spot welding. From 1932 to 1934 Mr. Tilsher was in Europe as consultant on special resistance welding processes developed by the Edward G. Budd Mfg. Co. of Philadelphia, and since that time he has been active in the United States in this same line. Mr. Tilsher has recently been connected with the Edward G. Budd Mfg. Co. as assistant to works manager of the stainless steel division, and previous to that he was with Fairchild Aircraft Corp., American

GEORGE W. ROONEY, comptroller of the United States Steel Corp. of New Jersey.

JAMES CAMPBELL HODGE, vice-president and director of the Wellman Engineering Co.

WARNER G. TILSHER, factory manager of the Taylor-Winfield Corp.

Aeronautical Corp., and Wright Aeroplane Factory.

• **J. B. Morrow** has been elected president, Pittsburgh Coal Co., Pittsburgh, succeeding **J. D. A. Morrow** who has resigned. The men are not related. Mr. J. B. Morrow formerly was production vice-president of the company since 1938 and prior to that was preparation manager from 1927. He was connected with the Phelps Dodge Corp. for 20 years before joining the coal company.

• **C. W. Schuck** has been made research metallurgist, Braeburn Alloy Steel Corp., Braeburn, Pa. Mr. Schuck, a graduate of the Carnegie Institute of Technology, for the past seven years was connected with the Crucible Steel Co.

• **Alberto J. Ubbelohde** is in the United States on a business trip for a period of several weeks. Mr. Ubbelohde is one of the largest dealers and importers of steel and metals in the Argentine and Uruguay. He is making his office with Jules Dierckx who is directly connected with Alberto Ubbelohde & Co.

• **Edwin L. Brown** has been appointed blooming mill superintendent for the Gulfsteel Division of Republic Steel Corp. Born in Thomasville, Ga., Mr. Brown attended Thomasville and Atlanta schools and at the outset of the World War enlisted in the Canadian Army, becoming a member of the famous Princess Pat regiment. In 1919, Mr. Brown made his start in the steel business with Marks Mfg. Co., Indiana Harbor. After serving there in the coke plant, blast furnace and rolling mill departments in various supervisory capacities, he became superintendent of rolling mills for Northwestern Steel & Wire Co., Sterling, Ill., in 1936. Mr. Brown came to Republic from that position in July, 1940.

William Ross Crampton receives the post of superintendent of transportation of the Gulfsteel Division of Republic Steel Corp., and **W. G. Little** becomes assistant to Mr. Crampton.

Born in Bay City, Mich., Mr. Crampton obtained his schooling in that city and in Ashland and Antigo, Wis. He began work at the age of 14 as call boy with the Chicago & North Western Railway, then became a telegraph operator, brakeman, switchman, and finally conductor with the Great Northern and the Pennsylvania railroads. In January, 1918, he joined the Trumbull Steel Co., subsequently Republic Iron & Steel Co., and then Republic Steel Corp. His transfer to the Gulfsteel Division from Warren, Ohio, coincides with the assumption of his new responsibilities.

• **Roy Ratliff,** former assistant to vice-president and general manager of the Sloss-Sheffield Steel & Iron Co., has been appointed general manager of the company.

• **J. F. Brown,** Carnegie - Illinois Steel Corp., has been appointed construction engineer for the Chicago district and **A. J. Hulse** becomes chief engineer of South works, succeeding Mr. Brown. Mr. Brown was first employed at South works in 1904 in the civil engineering department. Shortly afterward he became assistant chief civil engineer and in 1906 was appointed chief civil engineer, the position he held until 1930 when he was made construction engineer. Two years later he became acting chief civil engineer and in 1936 was given the post of chief engineer, the position he held until the present time. Mr. Hulse entered the service of the corporation in 1936 as assistant chief engineer at South works. He was transferred to the Pittsburgh offices as staff engineer three years later and remained there in that capacity until this time. Before coming to the corporation he served as chief draftsman and assistant chief engineer for Republic Steel Corp., chief engineer for H. A. Brassert & Co., assistant chief engineer for Keystone Steel & Wire Co., and proposal engineer for the United Engineering & Foundry Co.

Obituary

• **George C. Newell,** well known Brown & Sharpe employee for over 35 years died Aug. 25 after a brief illness. Mr. Newell was connected with several machine companies before coming to Brown & Sharpe in 1905 in the screw machine manufacturing department. After serving as assistant foreman and foreman of lathes, he was made assistant to works superintendent in 1917, where he remained until placed in charge of the Cincinnati office in 1929. Following the closing of this office a few years later he returned to the sales department at Providence. In 1939 he assumed the duties of supervising purchasing of plant equipment which position he held at the time of his death.

• **Jess Parker,** sales engineer of the International Conveyor & Washer Corp., and for many years a factory executive in Detroit, died recently. Born in Georgetown, Ky., in 1894, Mr. Parker came to Detroit in 1914 being first employed by the Remy Electric Co. In 1918 he enlisted in the army and served in the quartermaster corps in a manufacturing, supervisory capacity at Buffalo, being discharged with the rank of captain. He was employed for many years by Hudson Motor Car Co. at Detroit, Jordan Motor Car Co. at Cleveland, the Dietrich Division of Murray Corp. of America, Detroit and the Oaks Production Co. of Chicago. He joined the International Conveyor organization four years ago.

• **Harry L. Hudson,** president of the H. L. Hudson Co., Brooklyn, N. Y., died at his residence in Hempstead at the age of 73. Mr. Hudson was in active management of the decorated metal box manufacturing company which he founded up to time of his death. He began his business career in this field with Somers Brothers and the American Can Co., going into business for himself in 1908. Mr. Hudson was the inventor of a non-collapsible folding box for the stamp pad trade and held a number of other patents in the closure field.

• **Matthew McWhinney Cadman,** aged 64, director of raw materials for Carnegie Illinois Steel Corp., Pittsburgh, died Aug. 25 at Pittsburgh. Mr. Cadman had been associated with the steel corporation for 37 years and was also director of the A. W. Cadman Mfg. Co., Pittsburgh.

Carboloy Announces 6th Price Reduction

Plus New "Universal" Standard Tools for 80 Per Cent of All Turning, Boring, Facing Jobs

SINCE the year when Carboloy tools were first introduced it has been the expressed aim of Carboloy Company to pass on to industry savings resulting from increased consumption and manufacturing efficiencies.

As a tangible result of this policy, five major price reductions were put into effect between 1929 and 1939.

For a number of years, however, we have realized that if our ultimate goal of reducing the price of Carboloy cutting tools to a level that would make them available for the widest possible use was to be reached, mass production methods of manufacture, through greater standardization, would have to be effected.

Toward this end one of our major activities has been to determine the minimum number of grades and the simplest line of tools that would be applicable to a substantial majority of carbide tool applications.

New $1,000,000 Plant Part of Program

Concurrent with this, we inaugurated a long-range program of manufacturing development to establish maximum efficiency for standardized production. This culminated in the expenditure of a million dollars on a new plant and equipment completed last spring, having a production capacity of ten times the amount of cemented carbide then consumed by industry, with provisions for expanding metal production to many times that amount.

Mass Production of Standard Tools Now Possible

Today we are happy to announce that this program has been completed. One of the outstanding results of this program now made available to industry is a line of standardized tools at prices that would have seemed beyond the realm of possibility only a few years ago. Indicative of the extent to which standardization has been developed is the fact that these tools—covering 80 per cent of all carbide tool requirements—comprise but five styles in three grades—two for cast iron, and one for steel.

Example of New Standard Tool Prices

$\frac{3}{8}$ in. Square Style 4 Tool
in lots of one—was $5.84
NOW $1.85

In lots of 50—
NOW 90 CENTS

General Price Reduction on Carboloy Metal

A further result of this standardization program is that—because of the anticipated wider scale use of carbide tools—the cost of producing basic cemented carbides can be reduced to such an extent that we are able to announce the sixth general price reduction on carbide metals. This affects special tools, dies for working wire, bar, tubing and sheet metal, Carboloy wear resistant inserts, etc., in proportion to the amount of Carboloy metal used in each product.

CARBOLOY COMPANY, INC., DETROIT, MICHIGAN • Chicago • Cleveland • Newark • Pittsburgh • Philadelphia • Worcester, Mass.

CARBOLOY
REG. U. S. PAT. OFF.

The Mark of CARBOLOY
REG. U. S. PAT. OFF.

TUNGSTEN CARBIDE—TANTALUM CARBIDE—TITANIUM CARBIDE

FOR CUTTING, DRAWING, SHAPING, EXTRUDING METALS AND NON-METALLICS ★ FOR REDUCING WEAR ON EQUIPMENT OR PRODUCTS YOU USE OR MAKE

The Iron Age Comparison of Prices

Advances Over Past Week in Heavy Type; Declines in Italics

Flat Rolled Steel: (Cents Per Lb.)	Sept. 3, 1940	Aug. 27, 1940	Aug. 6, 1940	Sept. 5, 1939
Hot rolled sheets	2.10	2.10	2.10	2.00
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip	2.10	2.10	2.10	2.00
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Tin and Terne Plate: (Dollars Per Base Box)				
Tin plate	$5.00	$5.00	$5.00	$5.00
Manufacturing ternes	4.30	4.30	4.30	4.30
Bars and Shapes: (Cents Per Lb.)				
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Wire and Wire Products: (Cents Per Lb.)				
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.40
Rails: (Dollars Per Gross Ton)				
Heavy rails	$40.00	$40.00	$40.00	$40.00
Light rails	40.00	40.00	40.00	40.00
Semi-Finished Steel: (Dollars Per Gross Ton)				
Rerolling billets	$34.00	$34.00	$34.00	$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Wire Rods and Skelp: (Cents Per Lb.)				
Wire rods	2.00	2.00	2.00	1.92
Skelp (grvd.)	1.90	1.90	1.90	1.90

Pig Iron: (Per Gross Ton)	Sept. 3, 1940	Aug. 27, 1940	Aug. 6, 1940	Sept. 5, 1939
No. 2 fdy., Philadelphia	$24.84	$24.84	$24.84	$22.84
No. 2, Valley furnace	23.00	23.00	23.00	21.00
No. 2, Southern Cin'ti	23.06	23.06	23.06	21.06
No. 2, Birmingham	19.38	19.38	19.38	17.38
No. 2, foundry, Chicago†	23.00	23.00	23.00	21.00
Basic, del'd eastern Pa.	24.34	24.34	24.34	22.34
Basic, Valley furnace	22.50	22.50	22.50	20.50
Malleable, Chicago†	23.00	23.00	23.00	21.00
Malleable, Valley	23.00	23.00	23.00	21.00
L. S. charcoal, Chicago	30.34	30.34	30.34	28.34
Ferromanganese‡	120.00	120.00	120.00	80.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton. ‡For carlots at seaboard.

Scrap: (Per Gross Ton)	Sept. 3, 1940	Aug. 27, 1940	Aug. 6, 1940	Sept. 5, 1939
Heavy melting steel, P'gh.	**$19.00**	$18.75	$18.25	$16.25
Heavy melt'g steel, Phila.	**20.25**	20.00	19.00	16.75
Heavy melt'g steel, Ch'go.	**18.625**	18.50	17.25	13.875
Carwheels, Chicago	**19.25**	18.75	18.25	12.75
Carwheels, Philadelphia	21.25	21.25	20.75	16.25
No. 1 cast, Pittsburgh	19.75	19.75	19.75	16.00
No. 1 cast, Philadelphia	22.25	22.25	21.25	16.75
No. 1 cast, Ch'go (net ton)	17.25	17.25	16.75	12.75
Coke, Connellsville: (Per Net Ton at Oven)				
Furnace coke, prompt	$4.75	$4.75	$4.25	$3.75
Foundry coke, prompt	5.25	5.25	5.25	4.75
Non-Ferrous Metals: (Cents Per Lb. to Large Buyers)				
Copper, electro., Conn.*	11.00	11.00	11.50	12.50
Copper, Lake, New York	11.00	11.00	11.50	12.50
Tin (Straits), New York	*50.50c.*	50.625	52.25	59.00
Zinc, East St. Louis	6.50	6.50	6.25	5.75
Lead, St. Louis	4.75	4.75	4.85	5.10
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	14.00

*Mine producers only.

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 90 to 96 herein.
On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

Composite Prices

	FINISHED STEEL	PIG IRON	SCRAP STEEL
Sept. 3, 1940	2.261c. a Lb.	$22.61 a Gross Ton	$19.29 a Gross Ton
One week ago	2.261c. a Lb.	$22.61 a Gross Ton	$19.08 a Gross Ton
One month ago	2.261c. a Lb.	$22.61 a Gross Ton	$18.17 a Gross Ton
One year ago	2.236c. a Lb.	$20.61 a Gross Ton	$15.62 a Gross Ton

	FINISHED STEEL High	FINISHED STEEL Low	PIG IRON High	PIG IRON Low	SCRAP STEEL High	SCRAP STEEL Low
1940	2.261c., Jan. 2	2.211c., Apr. 16	.....	.....	$19.92, June 18	$16.04, Apr. 9
1939	2.286c., Jan. 3	2.236c., May 16	$22.61, Sept. 19	$20.61, Sept. 12	22.50, Oct. 3	14.08, May 16
1938	2.512c., May 17	2.211c., Oct. 18	23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7
1937	2.512c., Mar. 9	2.249c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.92, Nov. 10
1936	2.249c., Dec. 28	2.016c., Mar. 10	19.73, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.062c., Oct. 1	2.056c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29
1934	2.118c., Apr. 24	1.945c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	1.953c., Oct. 3	1.792c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.915c., Sept. 6	1.870c., Mar. 15	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	1.981c., Jan. 13	1.883c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.192c., Jan. 7	1.962c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.236c., May 28	2.192c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

Based on average for basic iron at Valley furnace and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Summary of the Week

• Labor Day holiday reduces industry operating rate to 82 per cent, but there is an immediate rebound . . . Iron and steel exports at new high . . . Lake Superior ore movement largest since 1937 . . . National defense a growing factor in steel orders.

THE fact that some steel plants were operated on Labor Day at over-time wage costs indicates the continued strong demand for steel. The temporary cessation reduces the industry's production this week to 82 per cent from 91½ per cent last week.

All indicators point to the probability of extreme activity during the remaining four months of this year.

Steel scrap prices have been moving into higher ground in the past few weeks without the speculative excitement which accompanied last fall's rise. No. 1 heavy melting steel is up $1.50 at Buffalo, $1 at Cleveland and Youngstown and lesser amounts elsewhere. THE IRON AGE composite price, an average of Pittsburgh, Chicago and Philadelphia, has advanced only 21c., however, to $19.29, which is within 63c. of this year's peak of $19.92 recorded in June.

Lake Superior vessel movement of iron ore, totaling 10,534,431 gross tons in August, was the highest since August, 1937. The season's movement to Sept. 1 was 38,236,609 tons against 22,495,767 tons for the same period last year. If the August rate is maintained to the end of the navigation season, the year's total will be close to 60,000,000 tons.

EXPORTS of iron and steel, which have been of growing importance in the industry's high operations, set an all-time high of 707,800 gross tons in July, which made the seven-month total 3,478,423 gross tons. The July steel movement was equal to 14.2 per cent of the industry's output. Export business, however, represents 20 to 25 per cent of some steel companies' shipments.

National defense requirements continue to expand and are now accounting for a considerable share of current steel bookings. This trend is most marked in the heavy products, particularly semi-finished steel, structural shapes, plates, bars and alloy steels in all forms. Demand is relatively lighter in sheets, strip, wire products and tubular products, but weakest of all is tin plate, in which operations next week probably will not exceed 50 per cent of capacity. This situation is due to the approach of the end of the food packing season and to large inventories of tin plate at can plants and in mill warehouses.

FABRICATED structural steel lettings and inquiries reflect an increasing number of projects associated with national defense. Jobs totaling 40,200 tons (highest for any week thus far in 1940) on which bids are being asked include 7300 tons for a military tank plant at Centerline, Mich., to be built by the Chrysler Corp.; 3000 tons for a plant for the Pratt & Whitney division of United Aircraft Corp. at East Hartford, Conn.; 3000 tons for aviation facilities at the Naval station at Alameda, Cal.; 2500 tons for a floating dry dock for the Navy on the Pacific Coast; 1150 tons for government warehouses in Philadelphia. Projects awarded, totaling 21,600 tons, include 2900 tons for airplane hangars at Quonset Point, R. I.; 2150 tons for a machine shop at the Norfolk Navy Yard; 1000 tons for the Allison engine division of General Motors Corp. at Indianapolis. Reinforcing steel awards of 7150 tons include 3000 tons for a building at the Brooklyn Navy yard.

DEFENSE contracts, especially such as those awarded to the Wright and Pratt & Whitney airplane engine builders for a total of 37,000 engines, will throw an additional heavy burden on the machine tool industry, which is now generally operating three shifts at maximum capacity. The machine tool industry's output this year will probably total about $400,000,000 against half that amount last year, while the 1941 output, based on expected demand, is projected as $600,000,000, which will necessitate an expansion in the industry's facilities.

So far as the national defense program is concerned steel companies believe that the buying movement has just begun. Inquiries from the United States and British governments are very heavy and some large orders are expected this month. Several thousand tons of plates and shapes will be needed for a large British order for truck trailers. Other inquiries now pending include steel for bomb racks, anti-aircraft shells and other shell work. A corn crib program of the U. S. Department of Agriculture will take about 45,000 tons of galvanized sheets. Additional cargo boats awarded by the Maritime Commission will require 50,000 tons of steel. Meanwhile the automobile industry is taking larger tonnages of steel, the railroads are expected to place additional equipment orders and their seasonal rail buying is due soon. All of which adds up to heavy pressure on the steel mills during the next several months at least.

The Industrial Pace . . .

FURTHER INTENSIFICATION of activities in the durable goods industries was in evidence in the past week, according to THE IRON AGE index, which came close to breaking through the 90-mark. The combined index for the past week stands at 89.4, a rise of 1.9 points over the preceding week and the highest since the week of June 29 when the index touched 90, but immediately slipped back as the automobile industry went into its annual changeover period. Excepting the week of June 29, the index is highest since the first week of February.

All components of the index but the construction series were higher in the week, the largest gain being recorded, as could be expected, by the automobile series. The loss in the construction component has no especial significance as it is hardly possible to maintain the abnormally high volume of awards, $128,449,000, placed in the preceding week. Contracts for heavy engineering projects in the past week amounted to $57,444,000, with private work accounting for $20,318,000 and publicly financed work $37,126,000.

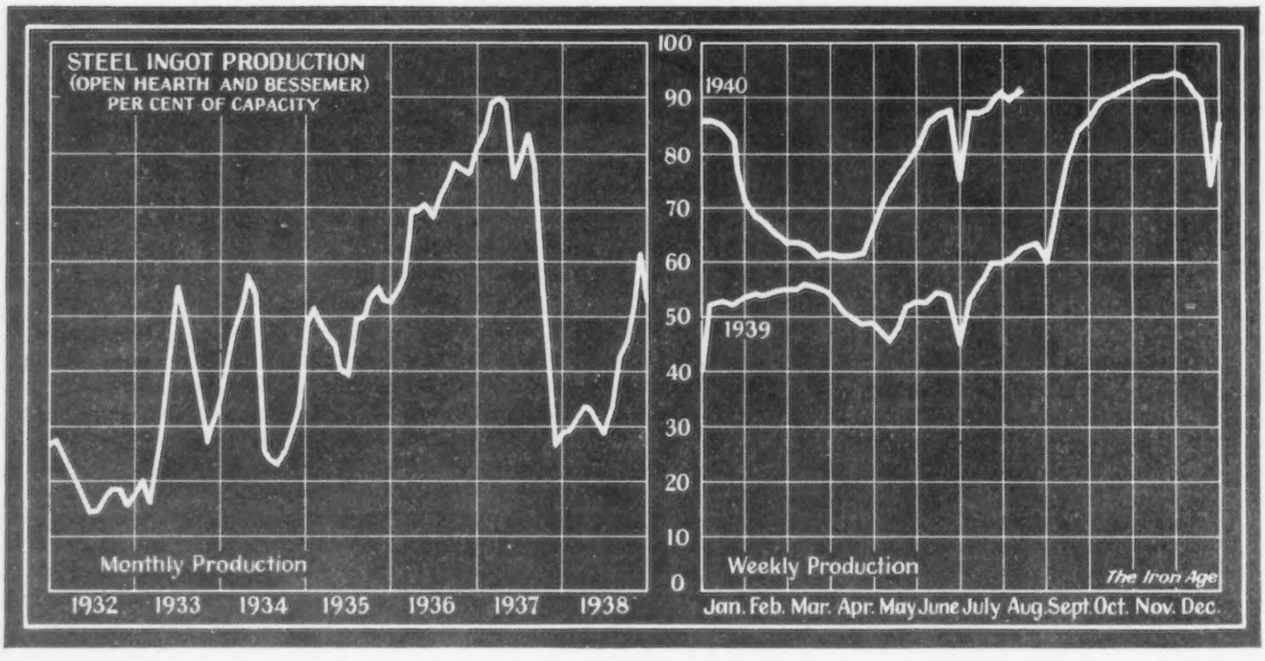
Despite the week's letdown, the average for the past three months, which is used in computing this series, stands at $77,100,000, as compared with an average of $70,400,000 prevailing a month ago and $57,500,000 two months ago. Total construction awards placed for the year to date aggregate $2,134,721,000, a gain of 4 per cent over the comparable period of 1939.

THE WEEK'S IMPROVEMENT in the lumber carloading series is largely a reflection of the recent increase in construction activity caused by the defense program. The steel index for the past week, 138.9, was only 1.8 points below the high of 1939 recorded in the last two weks of November of that year.

Supporting the strength shown by most of the factors in THE IRON AGE index over the past two months, is the sharp rise in manufacturers' orders in July (see graph). This rise, as reported by the National Industrial Conference Board, was the sharpest since the outbreak of war in October, 1939, and brought the index to the highest level since that month. With the exception of October and September, 1939, and December, 1936, the July order index is the highest since 1929. Heaviest increases in July occurred in the building, electrical, machinery and railroad equipment industries. Orders for non-durable goods were off slightly.

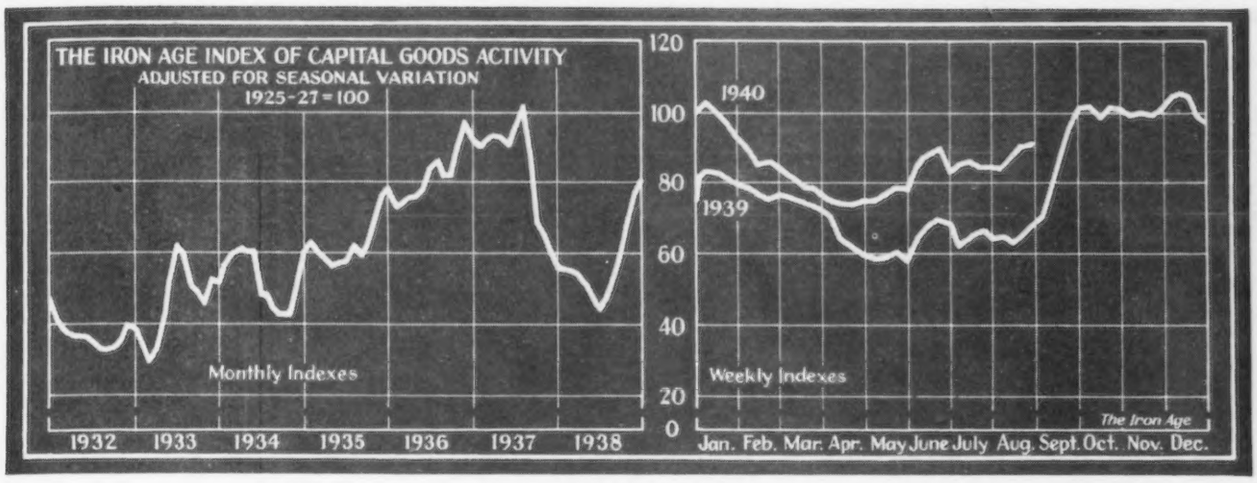
Inventories have not yet shown the effects of this heavy buying, an indication that probably a large portion of the purchases are going directly into consumption. There has been, however, a fairly continuous expansion in inventories since the outbreak of war and in July stocks were highest since January, 1938 (see graph). The largest inventory increases in July occurred in the chemical, iron and steel, machinery, paper and railroad equipment industries.

Holiday Lowers Ingot Output to 82% of Capacity



District Ingot Production, Per Cent of Capacity	Pitts-burgh	Chicago	Valleys	Phila-delphia	Cleve-land	Buffalo	Wheel-ing	Detroit	Southern	S. Ohio River	West-ern	St. Louis	East-ern	Aggre-gate
Current Week . .	74.0	78.5	79.5	77.5	80.0	89.5	98.0	85.0	78.0	74.0	55.0	89.0	62.0	**82.0**
Previous Week . .	87.0	98.5	88.0	93.0	89.0	100.5	105.0	100.0	93.0	84.0	63.0	93.5	75.0	**91.5**

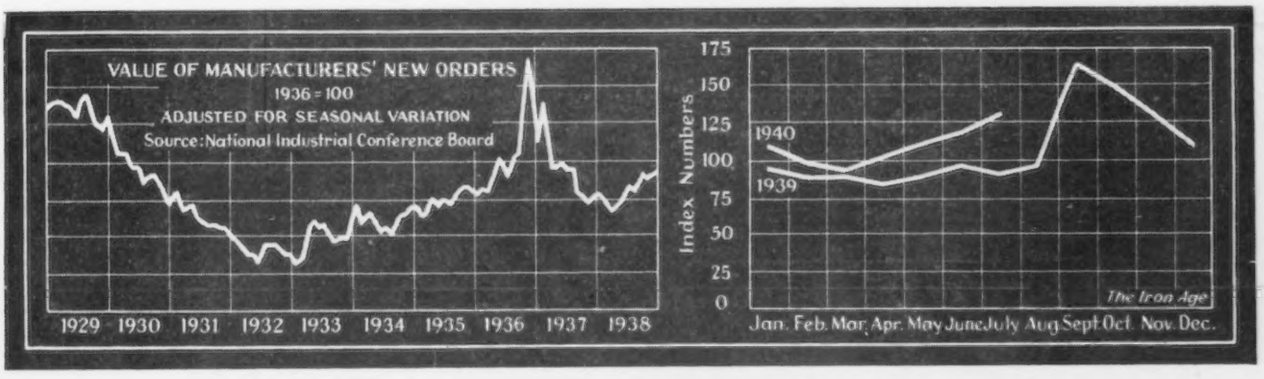
Capital Goods Index Gains 1.9 Points to 89.4



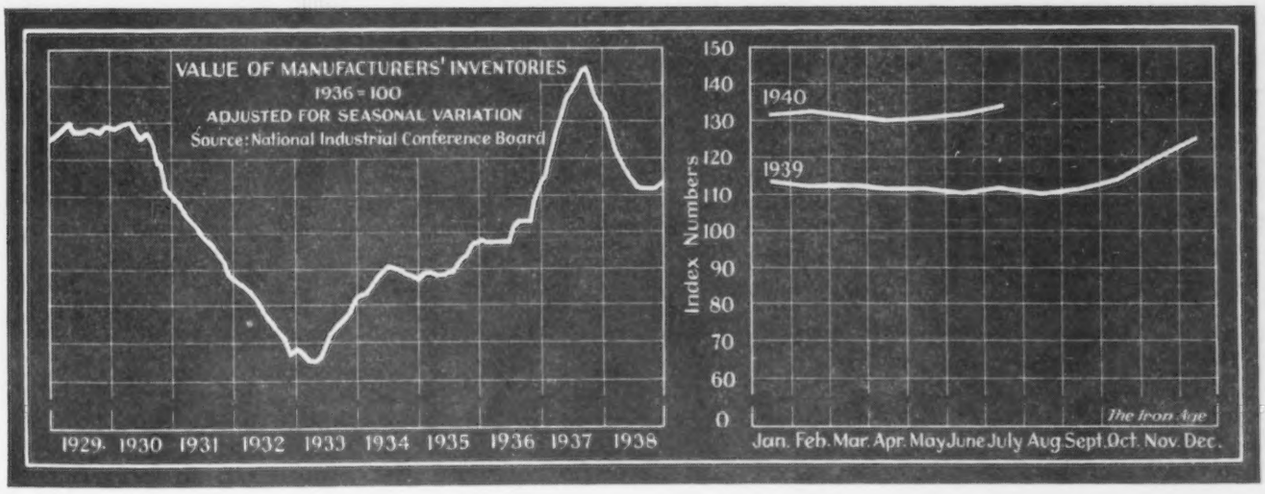
Component — Week Ended	Aug. 31	Aug. 24	Aug. 3	Sept. 2 1939	Aug. 31 1929
Steel ingot production[1]	138.9	135.4	129.3	96.8	124.0
Automobile production[2]	34.5	29.0	26.4	46.1	120.0
Construction contracts[3]	95.6	99.3	87.1	70.6	109.8
Forest products carloadings[4]	67.9	65.0	67.9	57.0	120.8
Pittsburgh output and shipments[5]	110.1	108.6	110.8	80.5	125.8
COMBINED INDEX	89.4	87.5	84.3	70.2	120.1

Sources: [1] THE IRON AGE; [2] Wards Automotive Reports; [3] *Engineering News-Record;* [4] Association of American Railroads; [5] University of Pittsburgh. Indexes of forest products carloadings and activity in Pittsburgh area reflect conditions as of week ended Aug. 24. Other indexes cover week of Aug. 31.

July Orders Rise Sharply to Nine Months' Peak



Manufacturers' Inventories Gain Moderately in July



Market News

. . . THE WEEK'S ACTIVITIES IN IRON AND STEEL

Prices

. . . . Extras on hot rolled plain plates revised

Several changes have been made in the list of extras for hot rolled carbon steel plain plates and floor plates effective Sept. 1. A few important changes have also been made in the list of extras for hot rolled alloy steel but these will not go into effect until Oct. 1.

A summary of the more important changes in the list of extras for hot rolled carbon steel plain plates made is as follows: On carbon plates with a maximum of 0.33 to 0.40 carbon inclusive, the maximum thickness limits for shearing are 1½ in. on rectangular plates and ¾ in. on circular plates, the previous maximum limits having been 2 in. and 1 in. respectively. On width and diameter extras, specified widths or diameters of over 6 to 12 in. exclusive and 12 in. to 24 in. exclusive, the width extras on specified thickness or weight of one-quarter in. or over or 10.2 lb. or over are base only when universal mill plates are ordered or the mill is given the option of furnishing a sheared or universal mill product. If the buyer specifies a sheared mill product, width extras are applicable. Specified width items have been increased by one by breaking up the "over 48 to 72 in. inclusive" into "over 48 to 60 exclusive" and "60 to 72 in. inclusive."

Length extra items have been revised and the base applies in lengths of 5 ft. to 80 ft. inclusive, as against 3 to 80 ft. heretofore. An additional length extra item of 3 to 5 ft. exclusive, taking an extra of 15c. a 100 lb. has been added.

Additional flame cutting extras covering various items for 12½ to 15½ in. thick, heretofore not published, have been added.

A summary of the more important changes to be made in the hot rolled alloy list is as follows: Extras for alloy content on finished and semi-finished products will be increased $3 a ton on the SAE 2300 series, $6 a ton on the 2500 series, $2 a ton on the 4600 series, and $3 a ton on the 4800 series. The nickel-chrome-vanadium grade extra has been eliminated from the list.

A new extra card on hot rolled alloy steel plates is expected to be issued soon.

New Business

. . . Total volume of orders in excess of shipments

Total steel bookings at PITTSBURGH in August were 10 to 15 per cent less than the volume booked in July. However, the showing was considered to be exceptional in the face of scattered summer seasonal influences. With price announcements out of the way, there is already evidence of increased buying by some consumers who, although expecting reaffirmation, did not want to make commitments until the official price was known.

Export buying in the past 10 days, especially from the British, has been substantial, while domestic purchases continue to disclose a fairly wide diversification but with accent on demand for heavy steels such as plates, structural shapes, piling and hot rolled bars.

It is becoming increasingly apparent that mill deliveries are becoming further extended on some products, and it is worthy of note that the total volume of incoming steel business in the past two weeks has continued to reach mills in excess of theoretical capacity for producing steel.

Steel makers are looking forward to increased automotive purchases, additional freight car awards, seasonal buying of rails, and a substantial increase soon in the effects of the national defense program.

Weakest spot in the entire picture is the tin plate situation, where new business and production have sagged substantially in the past three weeks. Operations are affected this week by holiday shutdowns, but next week are not expected to reach much, if any, above 50 per cent of capacity.

September began at CLEVELAND with order backlogs of steel producers higher than at any time since last November and with very promising prospects for additional large tonnages in the near future. Incoming business at the close of August showed sharp improvement, particularly in stainless and alloy steel, wire rods, billets and cold finished bars. August was the best month this year for shipments by Cleveland producers, and second best of the year for orders. June is still the peak on orders, and July is in third place, below August by a slight margin.

Cleveland producers feel the buying movement has only begun as inquiries for the British and U. S. programs are exceptionally heavy. The British have an extensive list coming through involving bars, semi-finished and other products. Several thousand tons of plates and shapes will be required for a large British order of truck trailers. Other inquiries involve large tonnages for bomb racks, anti-aircraft shells and other shell work, rails, and automotive tonnages.

August steel bookings at CHICAGO range from slightly above the previous month to as much as 30 per cent behind. In the latter case a few large non-recurring orders which were booked in July are chiefly responsible for the poor comparison. Operations and shipments have been on such a continuously high level that backlogs have not had an opportunity to develop. Incoming business for weeks has been very close to the rate of shipments. Delivery delays of six to eight weeks on wide plates semi-finished and some sizes of hot rolled bars are the maximum that will be encountered in the Chicago district. The average delivery for all products is probably three to four weeks.

Demand for structural shapes and plates continues high and structural fabricators are anticipating a substantial increase in business as more and more federal projects are established. Inquiries for sheet piling are numerous and tonnage booked last week was the largest of the year to date.

Steel Operations

. . . Holiday brings temporary decline; some plants did not shut down

The temporary decline in steel production this week, due to the Labor Day holiday, brought the rate for the industry down to 82 per cent from 91½ per cent last week. However, the drop was less than usual because some plants did not entirely suspend operations over the holiday. The fact that they paid overtime wages for holiday work indicates the urgency of the demand for steel. It is indicated that next week's rate will be fully as high as that of last week.

Iron Ore

. . . Lake Superior vessel movement highest since August, 1937

Vessel shipments of Lake Superior iron ore from Upper Lake ports during August totaled 10,534,431 gross tons against 10,433,488 tons in July and 6,954,580 tons in August, 1939, according to the latest report of the Lake Superior Iron Ore Association of Cleveland. The tonnage moved last month was highest since August, 1937, at 10,811,381 tons. For the season up to Sept. 1 this year, 38,236,609 gross tons have been brought down against 22,495,767 tons to Sept. 1 last year.

Pig Iron

. . . Exports are heavier . . . Domestic shipments rising

Exports of pig iron in July were 70,790 tons, valued at $1,535,772, compared with 30,915 tons in June. United Kingdom accounted for 82 per cent, or 57,995 tons, of the July shipments. The Philadelphia customs district shipped 33,679 tons to England in July, compared with 17,549 tons in June. Other shipments to England in July were 8475 tons from the New York area and 15,841 tons from the Maryland district. Other exports in July included 9400 tons to Canada, 598 tons to Chile and 412 tons to China.

August shipments of CLEVELAND sellers were 10 to 15 per cent ahead of July deliveries. The month was the best of this year. Worried by talk of possible shortages, some consumers have begun clamoring for protective tonnages. One CLEVELAND seller is accepting business for fourth quarter without announcement and others are expected to follow suit.

CHICAGO shipments of pig iron and foundry coke were somewhat higher than the previous month and all indications point to a continuation of this upward trend in September. Gray iron foundries, especially those casting for the machine tool industry, and steel foundries are particularly active. Some of the malleable foundries and small jobbing shops are not quite so busy. The orders for castings that are being received today are tending more and more to the production type as far as quantity is concerned, and small jobbing shops find it difficult to accommodate such business.

Unfilled pig iron tonnage at PITTSBURGH is substantial and portends high level of operations at both steel making and merchant stacks for some time to come.

There has been quiet booking of fourth quarter business in the NEW YORK area in the past week, but tonnages are not outstanding.

Orders in the Philadelphia market were on the light side in the past week while shipments, which are heavy, were down slightly for the period. Pig iron, it is felt, has been considerably slower in feeling the effects of the national defense program than steel.

Semi-Finished Steel

. . . Demand in good volume, deliveries are extended

Although business late last week and early this week was influenced somewhat by Labor Day shutdowns, total bookings at PITTSBURGH previous to that period were substantially ahead of the volume booked in the week before. The pickup, due mainly to export placements, was not significant as semi-finished bookings have fluctuated from week to week, but the average tonnages booked reflect a high level of activity. Demand for skelp has been exceptionally good, wire rod sales for the month of August were down slightly from July experience but demand for billets and slabs was about on a par with that of July.

Specifications at CLEVELAND for August were practically identical in volume with those of July. Shipments showed a strong gain. Orders for wire rods have been particularly heavy. Due to the necessity of conserving supplies of skelp for producers' own operations.

Railroad Buying

. . . Union Pacific taking bids on 2000 underframes

Equipment buying in the past week was slow, with no new purchase reported. In addition to freight car awards reported in THE IRON AGE on Aug. 15, Atlantic Coast Line has ordered 125 flat cars from Greenville Steel Car Co.

Union Pacific is taking bids on 2000 underframes for box cars to be built in its own shops. Duluth, Missable & Iron Range is inquiring for 100 gondolas, 30 ballast cars and 10 hopper cars.

Erie has ordered 4000 tons of rails, dividing the order between Carnegie-Illinois Steel Corp. and Bethlehem Steel Co.

Reinforcing Steel

. . . Brooklyn Navy Yard building takes 3000 tons

Reinforcing steel awards at 7150 tons include 3000 tons for a warehouse and office building at the Brooklyn Navy Yard.

New reinforcing steel projects call for 6250 tons, including 1500 tons at San Pedro, Cal., for fleet operating base buildings.

Bids opened on foundations for additional units of the Bonneville, Ore., power house show Puget Construction Co. of Tacoma, Wash., low bidder. The foundations will take about 7000 tons.

Considerable tonnage, running possibly into four figures, is expected to be involved in construction of a 6,000,000 bu. grain elevator, the largest in Buffalo, to be erected soon by H. G. Onstad of Chicago for Cargill, Inc., elevator operators with headquarters in Minneapolis.

Bolts, Nuts and Rivets

. . . Business in August was in increasing volume

August dollar sales of cap screw makers at CLEVELAND were around 15 per cent ahead of July. The month ended with orders brisk from

all types of industry and with inquiries exceptionally heavy. Rivet prices will be reaffirmed for fourth quarter, but bolt and nut and cap screw producers are not yet prepared to go on record.

Tubular Goods

. . . Sales are on a moderately better basis

Tubular goods sales on a daily basis during the past week at PITTSBURGH were at a level comparable to bookings in the week before. While oil country goods specifications have not been in as large a volume as some other products, the showing has been more satisfactory than a few months ago.

At CLEVELAND and YOUNGSTOWN demand for standard pipe has been brisk and enabled August to finish with a flourish, but not to overtake July. The 57-mile line for National Refining from Hooser to Coffeyville, Kan., recently given prominence in newspapers, was awarded some weeks ago to a Youngstown producer.

Sheets and Strip

. . . Automotive industry's needs are chief current support

Production last week was practically at capacity at CLEVELAND and YOUNGSTOWN. The big push is coming from the automotive industry, which is unusually eager for quick delivery and by far the most aggressive of all consumers. August at CLEVELAND was probably the heaviest month of the year for shipments, and September holds every promise of being equally active. Barring some unusual development, September orders will fall below the peak month of this year. The galvanized sheet market has been quite active due to the huge government corn crib program.

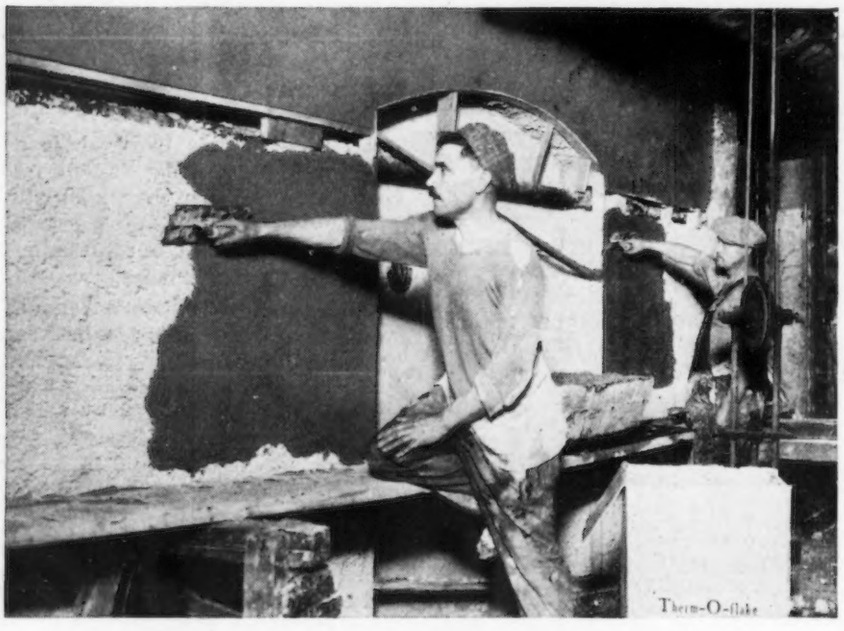
New orders for sheets at the full market price are being received at CHICAGO district sales offices at a relatively slow rate when compared with demand for other products. In view of the heavy buying at the $4 a ton concession a few months ago, however, the current activity in sheets is somewhat of a surprise to sellers. Chicago sheet mills catering to the Detroit automobile industry have indicated that within 30 days sheet requirements may reach their peak. Most of the sheets now on the books at the low prices will have been shipped by the end of September.

Total sheet and strip business at PITTSBURGH in the period not including the days affected by the Labor Day shutdown was on a par with the previous period.

Wire Products

. . . Sales in good and in fairly steady volume

Wire sales at PITTSBURGH were about on a parity with the experience of the week before up until Labor Day shutdowns. Aggregate August bookings, however, were slightly less than the volume placed in July with this condition applying for the most part to wire rod sales. Manufacturers' wire demand has been slightly more active and merchant wire requirements are still being influenced by seasonal factors.



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August closed at CLEVELAND with brisk and steady demand for manufacturers and special wires. At the same time orders for rods continued to be heavy, and backlogs are sufficient to last well through September. Moderately stronger activity is noted in the merchant wire field, presaging the fall season. Items for the construction industry have been moving exceptionally well.

August bookings at CHICAGO were about even with July, but September should show an appreciable increase.

Merchant Bars

. . . Bookings hold steady as defense work expands

Hot rolled bar sales in PITTSBURGH during August were about on a par with July bookings. The volume of fresh orders just previous to Labor Day, although down slightly from the level in the week before, continued to reflect widely diversified demand. The amount of steel bars involved either directly or indirectly in armament work continues to expand. A leading PITTSBURGH producer of cold finished carbon steel bars and shafting has reaffirmed present quotations for fourth quarter delivery. Details on revisions in hot rolled alloy steel extras will be found under "Prices."

Incoming orders at CHICAGO are comparable to those received a week ago.

At CLEVELAND August specifications fell behind those of July but reinforcing bars and special sections more than made up the difference. The comparisons include shell steel billets. Shipments for August showed a fair gain over July.

The Budd Mfg. Co. will require 2500 tons of annealed bars to be used in making fragmentation bombs for War Department.

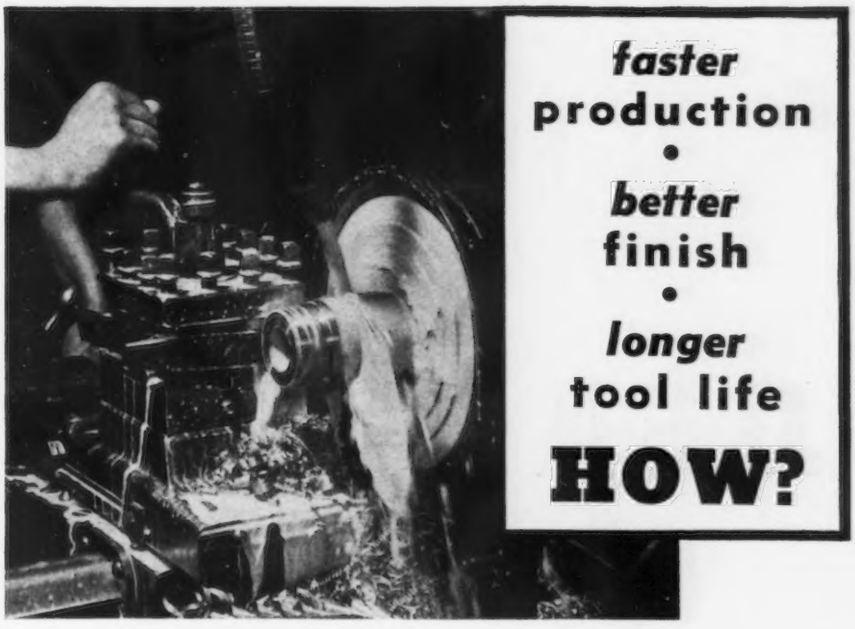
Warehouse Business

. . . August sales top July's . . . longer mill deliveries a factor

Warehouse sales in the New York area in August were on a par with July, and the usual seasonal decline in August did not materialize. Flat rolled items, specialties and stainless products were relatively most active, although the increase in plant improvement and expansion projects over the past six weeks has brought a little better call for the heavier material.

In the PHILADELPHIA district warehouse activity was rather sluggish during the early part of August but improved rapidly toward the latter part of the month, winding up the period with a considerably better volume of business than in July.

At CLEVELAND August sales were at least 10 per cent ahead of July and some specialized warehouses report even stronger improvement than that. The month proved the best of this year, but the record may not last long as prospects for September are very good. The desire for quick shipments to escape penalties and to facilitate construction projects has diverted much business to warehouses.



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August sales at BUFFALO were the best of any month so far this year, the district's two leading warehouses report.

Warehouse business in St. Louis for August is estimated to be about the same as for July, but 10 per cent better than August last year.

August sales at CHICAGO steel warehouses were up slightly over July and the month was probably the best August for a number of years.

Plates

. . . Demand especially heavy for wide material

Plate demand at PITTSBURGH, especially involving wide plates, continues to outrun actual shipments and production, with the result that backlogs are substantial. The lag in deliveries has caused additional consumers to get on the order books for future requirements. Steel mills are leaving no stone unturned in taking care of all consumers as well as possible under existing conditions.

Though demand at CHICAGO has not changed appreciably in the past week, bookings for the month are ahead of July. The fact that about $200,000,000 will be spent in that area alone on Army and Navy requirements probably means that plate backlogs will soon begin to mount. Delivery now ranges from virtually prompt on some narrow plates to around eight weeks on the wider sizes.

August specifications at CLEVELAND fell below July's volume and deliveries have improved with at least one maker. Minor changes in hot rolled carbon plate extras are being made.

Hull steel required for six tugs recently award to Robert Jacob, Inc., City Island, N. Y., has been placed with an EASTERN PENNSYLVANIA producer.

Demand in the Philadelphia area is well supported by requirements emanating from a variety of sources, including manufacturers of electrical equipment and fair sized shipyard specifications. Extra lists to be announced soon will apply on orders after Sept. 15 and shipments after Oct. 1, and will include hot-rolled and carbon plates as well as alloy material.

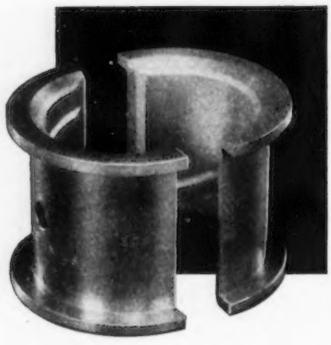
The Navy Department has cancelled its semi-annual schedule calling for 117,600 tons of steel, mostly plates and shapes, and is conferring with steel mills for a revised schedule. Material is for new ship and repair work requirements of various Navy yards for the six-month period from October, 1940 to March, 1941.

Tin Plate

. . . Operations poor as compared with other products

Tin plate operations are influenced somewhat this week by Labor Day shutdowns and are tentatively estimated at 43 per cent of capacity, down 11 points from last week, although a rebound is expected next week. Although no offi-

Babbitt Lined



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Sleeve BEARING HEADQUARTERS

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cial announcement has been made on tin plate prices, makers are accepting business at current prices for fourth quarter delivery. Material to be shipped after the end of this year will undoubtedly be governed by a price announcement to be made later in the year.

Shipbuilding

. . . 12 cargo ships awarded, take 50,000 tons of steel

The maritime commission last Thursday announced awards of 12 steam-propelled C-3 cargo ships requiring approximately 50,000 tons of steel to three companies, each of which will construct four vessels.

The awards, together with the cost of each ship, follow: Ingalls Shipbuilding Co., Birmingham, $2,945,000; Seattle-Tacoma Shipbuilding Corp., Seattle, Wash., $2,990,000; Western Pipe & Steel Co., Co., San Francisco, $2,990,000. All the awards were made on an adjusted price basis.

Structural Steel

. . . New projects total 40,200 tons, awards 24,810 tons

Fabricated structural steel lettings advanced to 24,810 tons from 21,600 tons last week. Sizable awards are 2900 tons for land plane hangars at Quonset Point, R. I.; 2150 tons for a machine shop at the Norfolk Navy Yard; 1550 tons for grade elimination in East 12th Street, Brooklyn; 1525 tons for 10 patients' buildings at Willowbrook, N. Y.; 1500 tons for a factory and boiler house at Anderson, Ind., for the Delco-Remy division of the General Motors Corp.; 1300 tons for the Libby-Owens Ford Glass Co., at Rossford, Ohio; 1000 tons for the Allison Engine Division of General Motors Corp., at Indianapolis, and 1000 tons for a bridge at Huntingdon, Pa.

New structural steel projects at 40,200 tons are the highest this year. Outstanding new jobs include 7300 tons at Centerline, Mich., for a tank plant for chrysler Corp.; 6700 tons for a state bridge over the Connecticut River between Hartford and East Hartford; 4000 to 5000 tons at Chester, Ill., for a bridge across the Mississippi River; 3000 tons at East Hartford, Conn., for the Pratt & Whitney Division, United Aircraft Corp.; 3000 tons for aviation facilities at the Alameda, Cal., naval station; 2500 tons for a floating drydock for the Navy Department on the Pacific Coast; 1700 tons for the Aluminum Co. of America at Vancouver, B. C.; 1150 for government warehouses at Philadelphia, and 1000 tons for a radio transmitter building for the General Electric Co., Schenectady, N. Y.

Structural steel specifications at PITTSBURGH continue to flow to mills at an exceptionally heavy rate and no let up is looked for in the near future. Deliveries are quite extended and many consumers are becoming worried as to their ability to obtain steel when wanted.

CLEVELAND reports the appearance of an inquiry involving several thousand tons of structural steel and plates to be used in the manufacture of truck trailers for Great Britain.

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When you put ARMCO Stainless Steels to work in aircraft construction you get these highly desirable advantages:

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ARMCO STAINLESS STEELS

Machine Tools

. . . SALES, INQUIRIES AND MARKET NEWS

Defense Orders at 25%

Chicago

• • • **Orders for machine tools** in August were equal in volume or considerably ahead of the preceding month. Good distribution throughout the month was reported and it is estimated by sellers that no more than 25 per cent of August bookings came directly from companies with defense orders from the Army or Navy. The number of such companies in this district is increasing daily, however, and it is only reasonable to assume that in a few months this proportion will have expanded materally. Among the large companies to place orders here in the past week or so were the Buda Co., Harvey, Ill.; the Electro-Motive Corp., La Grange, Ill.; the arsenal at Rock Island, Ill.; the Crane Co., Chicago; Bendix Products Co., South Bend, Ind.; Stewart-Warner Corp., Chicago, and the International Harvester Co., Chicago.

Buying Tempo Increasing

New York

• • • **As the month drew** to a close, buying of machine tools, heavy as it had been earlier in the month, actually showed an increase. While practically all the new business came from firms holding defense contracts or from the all-important aircraft industry, many feel that the real bulk of buying for defense production is yet to come and wonder what deliveries will be available at that time. In a matter of a few weeks, for example, deliveries quoted by one factory representative on a certain type of machine were advanced from January to July, 1941. Indications around here are that new orders were about double shipments in August. Present inquiries are often for lot of 10 to 25, or even higher in the case of the aircraft engine plants. There is every indication, incidentally, that the aircraft industry is in the process of swinging over to full mass production methods, employing line production of parts on special purpose machinery. Recent government orders have been for 17,000 and 20,000 engines.

Export buying continues, despite restrictions imposed by the new licensing law. Examples have been cited of machine tools reordered by the Russians after the machines ordered as long as a year ago had been commandeered by our own government. Great Britain and its Dominions are ordering heavily, but not all the equipment asked for is being cleared for export. The Japanese are doing little new buying and seem more concerned with getting delivery on machines they have on order.

August Output at Peak

Cleveland

• • • **From reports of producers** contacted in this area August shipments set a new peak. Undoubtedly the same situation prevailed elsewhere and it is possible the month may have been the best in history, but any records established now appear certain to be exceeded in forthcoming months. The estimate issued publicly a few months ago by one executive that this year's shipments might hit $300,000,000 is much too conservative.

September holds promise of being excellent for new business. Some very large government purchases are likely to break before the month is over.

From indications here, the machines which were piled on docks awaiting shipment have been moved elsewhere, clearing up a bothersome situation.

Backlogs Extend to Spring

Cincinnati

• • • **Substantial inquiries** for tooling the Curtis-Wright Corp. plant, to be erected near Cincinnati are reported, but no definite orders have yet been placed. This is only natural, since the land upon which the proposed plant is to be erected, has not yet been purchased, but is only in the negotiation stage. Other domestic orders are reported to be hanging fire, with delivery dates the retarding factor. Foreign ordering is chiefly from Canadian sources, although a few other orders are trickling in. One or two plants are discontinuing some variant lines and consolidating on specific types of tools, with a view toward increasing production. Of course, all special machines are also being discouraged with a view toward assisting in the increase of production.

Plants are still running at full capacity. The need for more skilled labor is still apparent.

Monarch Machine Tool To Issue More Stock

Sidney, Ohio

• • • **Directors of Monarch** Machine Tool Co., Sidney, Ohio, have voted to increase the total number of authorized no par shares from 200,000 to 250,000, and a special meeting of the company's shareholders to approve this action has been called for Sept. 10. "This action is contemplated in order that the number of shares of stock outstanding may more nearly reflect the company's large extensions of plant and equipment," Wendell E. Whipp, president of the company, said. "The company's recently completed 20,000 sq. ft. addition is its sixth plant expansion in the last six years."

Cleveland Automatic Machine Recapitalizes

Columbus, Ohio

• • • **Recapitalization** of the Cleveland Automatic Machine Co. into a basically common stock corporation, eliminating $1,068,825 in dividend arrearages, has been approved by the State Securities Division subject to ratification by 97 per cent of the preferred shareholders.

Non-Ferrous Metals

. . . MARKET ACTIVITIES AND PRICE TRENDS

New York, Sept. 3—Prices of all principal items in the non-ferrous markets remained unchanged during the past week while undertone was quiet but firm. Not much change in the domestic demand for copper was noted from the week before and sales volume tended to drop off toward the latter part of the week. All business was done on the basis of 11c. a lb., delivered, Connecticut Valley, with smelters and producers quoting this level. Export quotations held at 9.90c. a lb., f.a.s., despite the continuance of light activity from the previous week.

Both shipments and buying of copper was slightly better in August than the preceding month. August sales stand at better than 60,000 tons as compared with less than 59,000 for July. Consumption figures are as yet unavailable but it is estimated that they will be well in excess of 75,000 tons. Increased activity of brass and copper fabricators during recent weeks, in addition to foreign business, are responsible for the gains.

Zinc

Prices remained unchanged this week at 6.50c. per lb., St. Louis. Volume of transactions, however, was good, with substantial business closed on the average price basis because of the reluctance of sellers to fix a price in the present tight market situation. Many buyers saw initial demands going unfulfilled as sellers refused to meet any but the most urgent requirements of regular customers. Near capacity operations and the necessity of taking care of consumers' fall requirements in the very near future are giving the current quotation firm support.

Lead

Sales last week fell below previous weekly levels, but this had no effect on prices, as producers will have closed the month with sales well in excess of quotas, due to the abundance of activity in the earlier part of the month. Producers are not pressing for business, and stocks of lead remain at low levels. Demand opened this week a little more briskly with metal going in carload lots to a variety of consumers. October books have just been opened, September being about 70 per cent to 80 per cent sold. Principal interest seems to be exhibited by makers of pipe and storage batteries. Quotations are unchanged at 4.75c. a lb., New York.

Tin

Current tin price is 50.50c. a lb. for Straits metal, New York, in another extension of the inactive period during the past week. August deliveries totaling over 12,000 tons, established a new all-time record, exceeding that set in December, 1939, by more than 1000 tons. Deliveries for the first eight months of this year total more than 70,000 tons, as compared with slightly better than 40,000 tons in the corresponding period of last year and about 60,000 tons in the same period in 1929. Demand throughout the week was sporadic and generally on the light side. Consumers, however, continue to follow the Far Eastern situation very closely and any aggressive move on the part of Japan toward the Dutch colonies would likely start another buying movement here. The heavy buying of a few months ago is being reflected in a steady increase in domestic consumers' stock piles. Current rate of deliveries is substantially in excess of consumption and average consumers' inventory is estimated to be somewhat in excess of year's supply.

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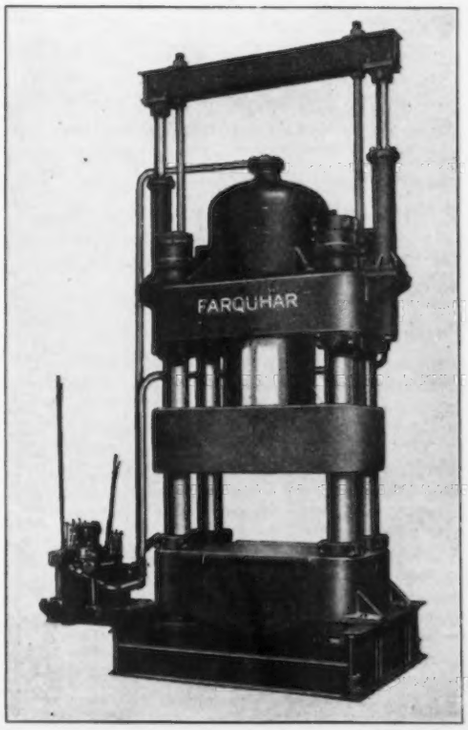


FARQUHAR HYDRAULIC PRESSES

Scrap . . . MARKET ACTIVITIES AND QUOTATION TRENDS

• • • **Price increases** are reported in practically all districts in a continuation of the upswing which began four weeks ago. Most of the advances reflect broker-dealer trading and are yet untested by actual mill purchases. The general sentiment, however, is that present quotations are, if anything, on the conservative side. This is borne out by purchases made in the past week at St. Louis and Buffalo. The Buffalo sale, amounting to 25,000 tons, was made at prices $1.50 over the quotation of two weeks ago.

Increases of an average of 25c. at Pittsburgh and Philadelphia and 12½c. at Chicago, have raised THE IRON AGE composite 21c. to $19.29, the fourth consecutive weekly advance from the low point of the recent weakness. The present composite price is highest since the last week of June and is 63c. below the current year's high of $19.92. The average composite price for August is $18.72, as compared with $18.47 in July and $19.31 in June.

Specialties are especially active in Chicago, advances of up to $2 on some items having occurred in the past week. In Buffalo, the bullishness has been intensified by the fact that shipments by boat, which of late have been important in supplying that area's requirements, will be cut off in about 10 weeks.

Pittsburgh

Market undertone continues strong, although a paradox exists with Valley interests taking everything that is loose in this district, while local buyers appear to be disinterested. Prices are substantially nominal and brokers are unable to pick up much No. 1 or No. 2 steel. No. 1 heavy melting is quotable this week at a flat $19, up 25c. from last week, while No. 2 heavy melting is quotable at $17.50 to $18. Much of the current strength in this market is due to the direct effect of purchases in this district by nearby areas as well as the strength present in other markets.

Chicago

Unusual activity and strength in specialty grades characterizes this market, some items being advanced $2. Heavy melting steel meanwhile continues strong with mill sales at $18.75. Brokers are forced to pay approximately that figure to cover their orders. Railroad heavy melting sold last week at around $19.75 gross, figured on a delivered Chicago basis.

Philadelphia

Still on the basis of broker buying for coverage, the market here pushed still higher this week, with No. 1 heavy melting steel being quoted at $20 to $20.50, and No. 2 steel at $19 to $19.50. Although no mill sales were reported, sentiment indicates that mill buying at less than $20 is improbable. Mill stock piles at present are none too large and, at the present level of operations, scrap will be needed in quantity to support winter activity.

Youngstown

No. 1 heavy melting steel is quoted up $1 here this week to a range of $20 to $20.50, amply substantiated. Other grades are up correspondingly. Open-hearth operations are holding up strong. High offers are being made on all sides for scrap.

Cleveland

No. 1 heavy melting steel is quoted up $1 at the start of this week to $19 to $19.50 on the basis of current activity. All other principal grades are up similarly. Actually the No. 1 quotation may be found low within a few hours. Advance offers for steel from the principal local railroad list indicate that the market has strengthened greatly.

Buffalo

Quotations on No. 1 steel scrap rose this week from $18.50 to $20 a ton, with a purchase at the latter figure of 25,000 tons by the district's largest consumer. Only a small percentage of this buy was No. 1 grade. Scrap shipments by boat will be cut off in another 10 weeks, a fact which may soon have a decided effect on the market here in view of anticipated operation of mills at capacity and a limited local scrap supply.

St. Louis

An East Side mill bought an undisclosed tonnage of No. 2 heavy melting steel at $15 a ton from three brokers, who say that they will handle the transaction at a loss, because country dealers are unwilling to part with their stocks at present prices. Short covering caused other items to advance this week.

Birmingham

The market here is somewhat firmer as shown by a price increase of $1 a ton on No. 1 and No. 2 heavy melting steel. Quantity of scrap in consumers' hands is reported smaller than on Aug. 1. Accumulations at dealers' yards are slow. The export market continues strong.

Cincinnati

The market here is stronger, although without definite test on prices. Dealers generally are bidding material up in anticipation of increased mill demand which appears to be inevitable on the basis of the present high rate of steel making. Currently, the entire list is being bid 50c. above the preceding week, with dealers' attitude continuously bullish.

Detroit

Automotive lists closing at the end of August and others which were scheduled to close early this week have given indications of keen competition for some items, with local brokers and out of town brokers attempting to outbid one another. However, the majority of offerings on automotive lists are moving at prices in line with those of a month ago. The isolated instances do not appear to be indicative of any general increase, and it is the consensus of opinion that at least until conditions have become clearer, quotations for this area are unchanged.

New York

The adverse weather and approach of the Labor Day holiday acted to restrict activity here in the past week and buying prices remained unchanged. Rate of loading for export is unchanged, the procurement of licenses for No. 1 material having become a routine matter.

Boston

Steel turnings for eastern Pennsylvania delivery are bringing $9 to $9.15 on cars, contrasted with $8.50 a week ago. Breakable cast for local use is $15.25 on cars and for eastern Pennsylvania $15, a shade firmer than heretofore. Otherwise scrap prices have not changed as there has not been sufficient business to test values. Sentimentally, however, the market is firmer. No. 1 steel for export is now $16.25 to $16.50 on dock, and No. 2, $14.75 to $15, an advance of 25c. Top prices predominate, and as high as $16.75 on dock has been paid for good scrap rails.

Toronto

Wide interest on the part of consumers and dealers continues in Canadian markets. Steel mills, electric furnace operators, foundries and various other melters are making special efforts to obtain new supplies to replenish rapidly depleting stocks and there is brisk call for all lines of scrap. Dealers in turn are bending every effort to obtain supplies to meet demands and are going much farther afield than formerly. Large mill consumers definitely are refusing to raise bids and as a consequence dealers are unable to make advances in their buying prices. Some, however, are paying higher than list prices for supplies to take care of customers' demands and are absorbing the difference. Imports from United States still are pouring into Ontario and Nova Scotia and it is stated that Canadian buyers are paying more for this imported scrap than for material obtained at home.

IRON AND STEEL SCRAP PRICES

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	....	$19.00
Railroad heavy mltng.	$20.50 to	21.00
No. 2 heavy melting	17.50 to	18.00
Railroad scrap rails	21.50 to	22.00
Rails 3 ft. and under	22.50 to	23.00
Comp. sheet steel	....	19.00
Hand bundled sheets	....	18.00
Heavy steel axle turn.	18.00 to	18.50
Machine shop turnings	14.50 to	15.00
Short shov. turnings	16.00 to	16.50
Mixed bor. & turn.	12.50 to	13.50
Cast iron borings	12.50 to	13.50
Cast iron carwheels	20.50 to	21.00
Heavy breakable cast.	17.00 to	17.50
No. 1 cupola cast	19.50 to	20.00
RR. knuckles & coup.	25.50 to	26.00
Rail coil springs	25.50 to	26.00
Rail leaf springs	25.50 to	26.00
Rolled steel wheels	25.50 to	26.00
Low phos. billet crops	25.50 to	26.00
Low phos. punchings	25.00 to	26.00
Low phos. heavy plate	24.00 to	24.50
Railroad malleable	23.50 to	24.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$20.00 to	$20.50
No. 2 hvy. mltng. steel	19.00 to	19.50
Hydraulic bund., new	20.00 to	20.50
Hydraulic bund., old	17.00 to	17.50
Steel rails for rolling	22.50 to	23.00
Cast iron carwheels	21.50 to	22.00
Hvy. breakable cast	20.50 to	21.00
No. 1 cupola cast	22.00 to	22.50
Mixed yard (f'd'y) cast	....	19.00
Stove plate (steel wks.)	....	17.50
Railroad malleable	22.50 to	23.00
Machine shop turn.	....	14.50
No. 1 blast furnace	13.00 to	13.50
Cast borings	13.00 to	13.50
Heavy axle turnings	18.00 to	18.50
No. 1 low phos. hvy.	24.00 to	24.50
Couplers & knuckles	24.00 to	24.50
Rolled steel wheels	24.00 to	24.50
Steel axles	23.50 to	24.00
Shafting	24.50 to	25.00
Spec. iron & steel pipe	17.00 to	17.50
Cast borings (chem.)	14.00 to	14.50

CHICAGO

Delivered to Chicago district consumers:

	Per Gross Ton	
Hvy. mltng. steel	$18.50 to	$18.75
Auto. hvy. mltng. steel alloy free	17.50 to	17.75
No. 2 auto steel	15.00 to	15.50
Shoveling steel	18.50 to	18.75
Factory bundles	18.00 to	18.25
Dealers' bundles	16.50 to	16.75
No. 1 busheling	17.50 to	17.75
No. 2 busheling, old	10.25 to	10.75
Rolled carwheels	22.50 to	23.00
Railroad tires, cut	23.00 to	23.50
Railroad leaf springs	21.50 to	22.00
Steel coup. & knuckles	22.00 to	22.50
Axle turnings	17.00 to	17.50
Coil springs	23.00 to	23.50
Axle turn. (elec.)	18.50 to	18.75
Low phos. punchings	21.00 to	21.50
Low phos. plates 12 in. and under	21.50 to	22.00
Cast iron borings	12.50 to	13.00
Short shov. turn.	13.00 to	13.50
Machine shop turn.	12.25 to	12.75
Rerolling rails	21.50 to	22.00
Steel rails under 3 ft.	21.50 to	22.00
Steel rails under 2 ft.	22.00 to	22.50
Angle bars steel	21.00 to	21.50
Cast iron carwheels	19.00 to	19.50
Railroad malleable	22.50 to	23.00
Agric. malleable	16.75 to	17.25
	Per Net Ton	
Iron car axles	24.50 to	25.00
Steel car axles	23.00 to	23.50
Locomotive tires	17.00 to	17.50
Pipes and flues	13.00 to	13.50
No. 1 machinery cast	17.00 to	17.50
Clean auto. blocks	17.50 to	18.00
No. 1 railroad cast	16.50 to	17.00
No. 1 agric. cast	15.00 to	15.50
Stove plate	11.50 to	12.00
Grate bars	12.50 to	13.00
Brake shoes	13.50 to	14.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$20.00 to	$20.50
No. 2 hvy. mltng. steel	19.00 to	19.50
Low phos. plate	23.00 to	23.50
No. 1 busheling	19.25 to	19.75
Hydraulic bundles	19.50 to	20.00
Machine shop turn.	14.00 to	14.50

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$19.00 to	$19.50
No. 2 hvy. mltng. steel	18.00 to	18.50
Comb. sheet steel	$18.50 to	$19.00
Light bund. stampings	15.50 to	16.00
Drop forge flashings	18.00 to	18.50
Machine shop turn.	12.50 to	13.00
Short shov. turn.	13.00 to	13.50
No. 1 busheling	18.25 to	18.75
Steel axle turnings	18.00 to	18.50
Low phos. billet and bloom crops	24.00 to	24.50
Cast iron borings	13.00 to	13.50
Mixed bor. & turn.	13.00 to	13.50
No. 2 busheling	13.00 to	13.50
No. 1 cupola cast	22.00 to	22.50
Railroad grate bars	15.00 to	15.50
Stove plate	15.00 to	15.50
Rails under 3 ft.	25.00 to	25.50
Rails for rolling	24.00 to	24.50
Railroad malleable	23.00 to	23.50

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$19.50 to	$20.00
No. 2 hvy. mltng. steel	17.50 to	18.00
Scrap rails	21.50 to	22.00
New hvy. b'ndled sheets	17.50 to	18.00
Old hydraul. bundles	16.00 to	16.50
Drop forge flashings	17.50 to	18.00
No. 1 busheling	17.50 to	18.00
Machine shop turn.	12.50 to	13.00
Shov. turnings	14.00 to	14.50
Mixed bor. & turn.	12.50 to	13.00
Cast iron borings	12.50 to	13.00
Knuckles & couplers	23.50 to	24.00
Coil & leaf springs	23.50 to	24.00
Rolled steel wheels	23.50 to	24.00
No. 1 machinery cast	19.50 to	20.00
No. 1 cupola cast	18.00 to	18.50
Stove plate	15.50 to	16.00
Steel rails under 3 ft.	24.50 to	25.00
Cast iron carwheels	18.00 to	19.00
Railroad malleable	22.00 to	23.00

ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:

Selected hvy. melting	$16.75 to	$17.25
No. 1 hvy. melting	16.25 to	16.75
No. 2 hvy. melting	14.75 to	15.25
No. 1 locomotive tires	17.00 to	17.50
Misc. stand. sec. rails	18.50 to	19.00
Railroad springs	20.00 to	20.50
Bundled sheets	11.50 to	12.00
Cast bor. & turn.	9.00 to	9.50
Machine shop turn.	9.50 to	10.00
Heavy turnings	12.50 to	13.00
Rails for rolling	20.50 to	21.00
Steel car axles	21.50 to	22.00
No. 1 RR wrought	12.50 to	13.00
No. 2 RR wrought	15.50 to	16.00
Steel rails under 3 ft.	21.25 to	21.75
Steel angle bars	18.00 to	18.50
Cast iron carwheels	18.25 to	18.75
No. 1 machinery cast	19.00 to	19.50
Railroad malleable	19.00 to	19.50
Breakable cast	16.50 to	17.00
Stove plate	12.50 to	13.00
Grate bars	13.00 to	13.50
Brake shoes	14.00 to	14.50

CINCINNATI

Dealers' buying prices per gross ton at yards:

No. 1 hvy. mltng. steel	$15.75 to	$16.25
No. 2 hvy. mltng. steel	14.25 to	14.75
Scrap rails for mltng.	21.25 to	21.75
Loose sheet clippings	11.25 to	11.75
Hyd'lic bundled sheets	15.00 to	15.50
Cast iron borings	7.25 to	7.75
Machine shop turn.	8.25 to	8.75
No. 1 busheling	11.75 to	12.25
No. 2 busheling	6.00 to	6.50
Rails for rolling	22.75 to	23.25
No. 1 locomotive tires	18.00 to	18.50
Short rails	23.25 to	23.75
Cast iron carwheels	17.25 to	17.75
No. 1 machinery cast	19.75 to	20.25
No. 1 railroad cast	18.25 to	18.75
Burnt cast	11.75 to	12.25
Stove plate	11.75 to	12.25
Agricul. malleable	16.25 to	16.75
Railroad malleable	19.25 to	19.75
Mixed hvy. cast	17.00 to	17.50

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting steel	....	$16.00
No. 2 hvy. melting steel	....	15.00
No. 1 busheling	....	13.00
Scrap steel rails	....	16.00
Steel rails under 3 ft.	....	18.00
Rails for rolling	....	18.00
Long turnings	....	5.00
Cast iron borings	....	8.50
Stove plate	....	11.00
Steel axles	....	16.00
No. 1 RR wrought	....	12.00
No. 1 cast	....	16.50
No. 2 cast	....	12.50
Cast iron carwheels	....	13.50
Steel carwheels	....	16.00

DETROIT

Dealers' buying prices per gross ton, f.o.b. cars:

No. 1 heavy melting	$15.00 to	$15.50
No. 2 heavy melting	14.00 to	14.50
Borings and turnings	10.75 to	11.25
Long turnings	9.75 to	10.25
Short shov. turnings	10.75 to	11.25
No. 1 cast	18.50 to	19.00
Automotive cast	18.50 to	19.00
Hvy. breakable cast	15.00 to	15.50
Stove plate	11.75 to	12.25
Hydraul. Comp. sheets	17.00 to	17.50
New busheling	16.00 to	16.50
Sheet clips	14.00 to	14.50
Flashings	15.00 to	15.50
Low phos. plate	18.50 to	19.00

NEW YORK

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mltng. steel	$15.50 to	$16.00
No. 2 hvy. mltng. steel	14.00 to	14.50
Hvy. breakable cast	16.00 to	16.50
No. 1 machinery cast	17.50 to	18.00
No. 2 cast	15.00 to	15.50
Stove plate	12.50 to	13.00
Steel car axles	20.00 to	20.50
Shafting	20.00 to	20.50
No. 1 RR. wrought	14.50 to	15.50
No. 1 wrought long	13.00 to	13.50
Spec. iron & steel pipe	12.00 to	12.50
Rails for rolling	16.50 to	17.50
Clean steel turnings*	9.00 to	9.50
Cast borings*	8.50 to	9.00
No. 1 blast furnace	8.50 to	9.00
Cast borings (chem.)	10.00 to	11.00
Unprepared yard scrap	8.00 to	8.50
Light iron	6.00 to	6.50

Per gross ton delivered local foundries:

No. 1 machin. cast	$18.00 to	$19.00
No. 2 cast	16.00 to	16.50

* $1.50 less for truck loads.

BOSTON

Dealers' buying prices per gross ton:

Breakable cast	$15.00 to	$15.25
Machine shop turn.	9.00 to	9.15
Mixed bor. & turn.	6.75 to	7.00
Bun. skeleton long	11.50 to	12.00
Shafting	19.00 to	19.25
Stove plate	11.25 to	11.50
Cast bor. chemical	8.00 to	8.50

Per gross ton delivered consumers' yards:

Textile cast	$17.00 to	$20.00
No. 1 machine cast	17.00 to	19.00

Per gross ton delivered dealers' yards:

No. 1 hvy. mltng. steel	$14.00 to	$14.50
No. 2 steel	13.00 to	13.50

PACIFIC COAST

Per net ton delivered to consumer:

	San Fran.	Los Ang.	Seattle
No. 1 hvy. mltng. steel	$13.00	$13.00	$13.00
No. 2 hvy. mltng. steel	12.00	12.00	12.00
Bundles	11.00	11.00	11.00

CANADA

Dealers' buying prices at these yards, per gross ton:

	Toronto	Montreal
Low phos. steel	$11.50	$11.00
No. 1 hvy. mltng. steel	11.25	10.75
No. 2 hvy. mltng. steel	10.00	9.50
Mixed dealers steel	8.75	8.25
Drop forge flashings	9.75	9.25
New loose clippings	8.75	8.25
Busheling	6.00	5.50
Scrap pipe	7.75	7.25
Steel turnings	7.25	6.75
Cast borings	6.75	6.25
Machinery cast	20.00	19.00
Dealers' cast	19.00	18.00
Stove plate	14.50	13.50

EXPORT

Dealers' buying prices per gross ton:

New York, truck lots, delivered, barges

No. 1 hvy. mltng. steel	$15.50 to	$16.00
No. 2 hvy. mltng. steel	14.00 to	14.50
No. 2 cast	15.00 to	15.50
Stove plate	12.50 to	13.00

Boston on cars at Army Base or Mystic Wharf

No. 1 hvy. mltng. steel	$16.25 to	$16.50
No. 2 hvy. mltng. steel	14.75 to	15.00
Rail (scrap)	16.25 to	16.75

Philadelphia, delivered alongside boats, Port Richmond

No. 1 hvy. mltng. steel	Nominal
No. 2 hvy. mltng. steel	Nominal

Construction Steel

. . .STRUCTURAL STEEL, REINFORCING BARS, PLATES, PILING, ETC.

Fabricated Steel

Lettings advance to 24,810 tons from 21,600 tons last week; new projects jump to 40,200 tons; plate awards only 450 tons.

AWARDS

NORTH ATLANTIC STATES

2900 Tons, Quonset Point, R. I., land plane hangars for Navy, to Phoenix Bridge Co., Phoenixville, Pa.

1550 Tons, Brooklyn, contract E-3, grade separation, East 12th Street, for Triborough Bridge Authority, to American Bridge Co., Pittsburgh.

1525 Tons, Willowbrook, S. I., N. Y., 10 patients' building, to Belmont Iron Works, Philadelphia.

1000 Tons, Huntingdon Pa., State highway bridge, to Bethlehem Steel Co., through L. M. Hutchinson.

700 Tons, Springfield, Mass., armory factory and laboratory, to Haarman Steel Co., Holyoke, Mass.; Ley Construction Co., Springfield, contractor.

620 Tons, Pottstown, Pa., building, Robinson Clay Products Mill, to Belmont Iron Works, Philadelphia.

550 Tons, Mercer County, Pa., highway bridge, to Bethlehem Steel Co., Buffalo.

550 Tons, Laphams Mills, N. Y., State highway bridge RC-40-66, to American Bridge Co., Pittsburgh.

490 Tons, Annapolis, Md., seaplane hangar, to Fort Pitt Bridge Works, Pittsburgh.

450 Tons, Pittsburgh, alterations, McCreery Building, for Pittsburgh Business Properties, to Keystone Engineering Co., Pittsburgh.

415 Tons, Wallingford, Conn., factory building No. 1, American Cyanamid Co., to Bethlehem Steel Co., Bethlehem, Pa.

255 Tons, Lycoming County, Pa., bridge route 353, section 3, to Phoenix Bridge Co., Phoenixville, Pa.

250 Tons, Syracuse, N. Y., bakery and garage for National Biscuit Co., to Syracuse Engineering Co., Syracuse.

245 Tons, Tioga County, Pa., bridge, to Fort Pitt Bridge Works Co., Pittsburgh.

210 Tons, New Britain, Conn., housing project 5-1, to National Steel Products Co.

200 Tons, Harrisburg, Pa., building extension for Harrisburg Steel Co., to Bethlehem Steel Co., Bethlehem, Pa.

180 Tons, New York, bank building for Chemical Bank and Trust Co., to Harris Structural Steel Co., Plainfield, N. J.

180 Tons, South Dennis, N. J., State highway bridge route 49, section 16, to American Bridge Co., Pittsburgh.

160 Tons, Shippenville, Pa., reconstruction, State bridge, to Keystone Engineering Co., Pittsburgh.

160 Tons, McKees Rocks, Pa., tunnel ribs, to Fort Pitt Bridge Works, through Michael Manella, Pittsburgh.

130 Tons, Livingston County, N. Y., highway bridge, to Bethlehem Steel Co., Buffalo; Potter & Dewitt, Bolivia, N. Y., general contractors.

160 Tons, Indiana, Pa., Maros stores and offices, to Keystone Engineering Co. through Monessen Amusement Co.

100 Tons, Allegany County, N. Y., highway bridge, to American Bridge Co., Pittsburgh; Steinbiser Co., Belfast, N. Y., general contractor.

100 Tons, Niagara Falls, N. Y., furnace building, Carborundum Co., to Lackawanna Steel Construction Co., Buffalo.

THE SOUTH

2150 Tons, Norfolk, Va., Navy Yard, machine shop, to Virginia Bridge Co., Roanoke, Va., through Rust Engineering Co., Pittsburgh.

1525 Tons, Raleigh, N. C., Durham Life Insurance Co., building to Dietrich Brothers, Inc., Baltimore.

410 Tons, Louisville, Ky., National Distillers Products Corp., to International Steel Co., Evansville, Ind.

300 Tons, Forrest County, Miss., bridge, to Vincennes Steel Corp., Vincennes, Ind.

280 Tons, Pisgah Forest, N. C., addition to warehouse, Ecusta Paper Mill, to an unnamed bidder.

125 Tons, Chatham County, Ga., bridge, to Virginia Bridge Co., Roanoke, Va.

110 Tons, Habersham County, Ga., bridge project, to Virginia Bridge Co., Roanoke, Va.

110 Tons, Covington, Va., highway bridge, to Roanoke Iron & Bridge Co., Roanoke, Va.

105 Tons, Mitchell County, Tex., bridge, to Virginia Bridge Co., Roanoke, Va.

CENTRAL STATES

1500 Tons, Anderson, Ind., factory building and boiler house, Delco-Remy Division, General Motors Corp., to Indiana Bridge Co., Muncie, Ind.

1300 Tons, Rossford, Ohio, expansion for Libby-Owens-Ford Glass Co., to Mississippi Valley Structural Steel Co., Decatur, Ill., through A. Bentley & Sons.

1000 Tons, Indianapolis, extension to buildings, Allison Engine Division, General Motors Corp., to R. C. Mahon Co., Detroit.

445 Tons, St. Louis, paint shop, American Car & Foundry Co., to Superior Structural Steel Co., St. Louis.

370 Tons, River Rouge, Mich., processing plant for General Chemical Co., to Pittsburgh Bridge & Iron Co., Pittsburgh, through W. E. Wood Co.

300 Tons, Indianapolis, building for R. C. A. Mfg. Co., to Pittsburgh Bridge & Iron Co., Pittsburgh.

285 Tons, Waterloo, Iowa, building for Northwestern Bell Telephone Co., to Pittsburgh-Des Moines Steel Co., Pittsburgh.

210 Tons, Burwell, Neb., State highway bridge, to Omaha Steel Works, Omaha.

190 Tons, Clyde, Ill., plant addition for Cece Steel Products Co., to Gage Structural Steel Co., Chicago.

175 Tons, Cleveland, factory for Eaton Mfg. Co., to Burger Iron Co., Akron, through Sam Emerson Co., Cleveland.

155 Tons, Omaha, 270 ft. viaduct, to Omaha Steel Works, Omaha, through Empire Construction Co., Omaha.

102 Tons, Port Huron, Mich., State highway bridge, to Yeager Bridge & Culvert Works, Port Huron, through E. G. Nolan & Sons.

100 Tons, Belding, Mich., State highway bridge, to R. C. Mahon, Detroit, through Cheney Wright Co.

WESTERN STATES

325 Tons, Los Angeles, projection stage for RKO Pictures Corp., to Pacific Iron & Steel Co., Los Angeles.

215 Tons, El Segundo, Cal., warehouse for Douglas Aircraft Co., to Bethlehem Steel Co., Bethlehem, Pa.

PENDING STRUCTURAL PROJECTS

NORTH ATLANTIC STATES

6700 Tons, Hartford-East Hartford, Conn., State bridge over Connecticut River.

3000 Tons, East Hartford, Conn., factory building for United Aircraft Corp., Pratt-Whitney Division.

1150 Tons, Philadelphia, warehouses for Quartermasters' Depot Department; bids taken.

1000 Tons, Schenectady, N. Y., radio transmitter building for General Electric Realty Corp.

750 Tons, Cheektowaga, N. Y., plant addition for Spencer Lens Co.; Gillmore-Carmichael-Olson Co., Cleveland, general contractor.

600 Tons, South Boston, post office garage.

550 Tons, New York, grandstand for Queens County Jockey Club.

420 Tons, Ashland, Mass., manufacturing plant, previously reported 200 tons.

350 Tons, Stratford, Conn., engineering building addition for United Aircraft Corp., Vought Sikorsky Division.

340 Tons, Chautauqua County, N. Y., State highway bridge.

330 Tons, Dorchester, Mass., warehouse for General Foods Corp.

325 Tons, Westfield, N. Y., highway bridge; bids in.

320 Tons, Carlisle, Pa., U. S. Medical School, H. A. Williams, Allentown, Pa., general contractor.

260 Tons, Allegheny County, Pa., highway bridge, bids Sept. 6.

225 Tons, Jefferson County, Pa., highway bridge; bids Sept. 6.

200 Tons, Dunkirk, N. Y., bridge; Bero Engineering & Construction Co., Tonawanda, N. Y., low bidder.

170 Tons, New York, contract No. 34 bulkhead wall, Marginal Street.

165 Tons, O'Hara Township, Pa., maintenance building for Allegheny County.

150 Tons, Erie County, N. Y., State bridge PSC-4667.

140 Tons, Ulster County, N. Y., State bridge RC-4075.

140 Tons, Beaver County, Pa., highway bridge, bids taken.

Weekly Bookings of Construction Steel

Week Ended ——→	Sept. 3, 1940	Aug. 27, 1940	Aug. 6, 1940	Sept. 5, 1939	Year to Date 1940	Year to Date 1939
Fabricated structural steel awards	24,810	21,600	20,045	9,250	642,835	651,275
Fabricated plate awards	450	1,245	6,090	1,640	110,250	112,275
Steel sheet piling awards	175	0	2,615	2,375	31,115	48,080
Reinforcing bar awards	7,150	13,965	7,925	9,610	318,765	322,620
Total Letting of Construction Steel	32,585	36,810	36,675	22,875	1,102,965	1,134,250

140 Tons, Hamburg, N. Y., highway bridge; bids in.
115 Tons, Newport, R. I., garage and storehouse for Navy Department.
110 Tons, Norwich, N. Y., alterations to school building.
110 Tons, Utica, N. Y., building for Faxton Hospital.
110 Tons, Niagara Falls, N. Y., laboratory for R. H. Chemical Department of E. I. du Pont de Nemours Co., Inc.
100 Tons, Ontario County, N. Y., highway bridge; bids in.
Unstated tonnage, Buffalo, 6,000,000-bu. grain elevator for Cargill, Inc.; H. G. Onstad, Chicago, general contractor.

THE SOUTH

350 Tons, Rutledge, Tex., trashracks for Marshall Ford Dam (Specifications 1404-D); Worden-Allen Co., Milwaukee, Wis., low bidder.
220 Tons, Gilbertsville, Ky., intake and service bay, Kentucky Dam, for TVA.

CENTRAL STATES

7300 Tons, Centerline, Mich., tank plant for Chrysler Corp.
4000 to 5000 Tons, Chester, Ill., bridge across Mississippi River, preliminary plans up for bids Sept. 21.
440 Tons, Gary, Ind., factory and warehouse addition for Republic Steel Corp.
240 Tons, Chagrin Falls, Ohio, Fairmount Boulevard extension for Cuyahoga County.
225 Tons, Alliance, Ohio, expansion for Taylorcraft Aviation, Inc.
190 Tons, Danville, Ill., tunnel shield for subway.
160 Tons, Caryville, Wis., State bridges Nos. 694, 695, 766; bids Sept. 5.
120 Tons, Chicago, contract D-2-C, mezzanine stations, subway.
115 Tons, Indianapolis, boiler house for Citizens Gas & Coke Utility.
100 Tons, Columbus, Ohio, Livingstone Avenue bridge, Couse & Saunders, Detroit, low bidder on general contract.

WESTERN STATES

3000 Tons, Alameda, Cal., aviation facilities, Naval Air Station; Johnson, Drake & Piper, Oakland, Cal., contractor.
2500 Tons, Pacific Coast, floating dry dock for Navy (Specification 9950); bids Sept. 18.
1700 Tons, Vancouver, B. C., four buildings for Aluminum Co. of America.
500 Tons, San Bruno, Cal., United Airlines hangar.
325 Tons, San Diego, Cal., United States Navy accessories overhaul building; bids taken.
270 Tons, Salt Lake City, Army temporary hangar; bids in.
150 Tons, Kettle Falls, Wash., under- and over-crossings for Great Northern Railway relocation (Specification 1421-D); bids Sept. 10.
150 Tons, Odair, Wash., spiral stairways for Grand Coulee Dam (Specification 1403-D); Isaacson Iron Works, Seattle, low bidder.

FABRICATED PLATES

AWARDS

250 Tons, Erie, Pa., tank for Allied Oil Co., to Chicago Bridge & Iron Co., Chicago.
200 Tons, Tampa, Fla., elevated water tank for MacDill Field, to Chicago Bridge & Iron Co., Chicago.

SHEET PILING

AWARDS

170 Tons, State of Texas, highway bridge, to Bethlehem Steel Co., Bethlehem, Pa.
105 Tons, Princeton, Cal., levee, to Palm Iron Works, Sacramento, Cal., through Poulos & McEwen, Sacramento, Cal., contractor.

Pipe Lines

Stanolind Oil & Gas Co., Tulsa, Okla., plans new 6 and 8-in. welded steel pipe line from KMA oil field, near Electra, Tex., to connection with main pipe line system, about 18 miles. Line will be built under direction of Stanolind Oil Purchasing Co., same address, an affiliated interest.

National Refining Co., Hanna Building, Cleveland, has authorized immediate construction of new 8-in. welded steel pipe line from Coffeyville, Kan., to Hooser oil field, near Winfield, Kan., about 54 miles, for crude oil transmission to oil refining plant at first noted place. Cost about $500,000 with booster stations and other operating facilities.

Natural Gas Pipe Line Co. of America, Inc., 20 North Wacker Drive, Chicago, plans welded steel pipe lines for extensions in system in northern Illinois and Wisconsin for natural gas transmission to several communities not served at present time. Also will build a new line from Texas Panhandle and Hugeton, Kan., gas fields for increased supply, connecting with main pipe line system running to Illinois area. Cost reported over $2,500,000 with booster stations and other operating facilities. Company is operated as a joint interest by several natural gas carriers, including Cities Service Co., 60 Wall Street, New York.

Pacific Gas & Electric Co., San Francisco, has let contract to Pacific Bridge Co., 333 Kearny Street, for new welded steel pipe line over Oakland Estuary, for natural gas transmission.

Beaumont, Tex., has called special election Sept. 10 to vote bonds for $1,700,000 for steel pipe lines for municipal gas distribution, including main welded steel pipe line for connection with supply source, totaling about 200 miles of 4 to 16-in., with control station and service facilities. Albert C. Moore & Co., Smith-Young Tower Building, San Antonio, Tex., are consulting engineers.

Franco Oils, Ltd., Cardston, Alta., has approved plans for new 4 and 6-in. welded steel pipe line from Battlefield oil area, near Vermillion, Alta., to latter place and vicinity. Cost close to $100,000.

Dallas, Ore., has taken bids on 16,000 ft. of 14-in. pipe and fittings. W. L. Soehren is city manager.

Bellingham, Wash., will take bids soon on 15,000 ft. of 48-in. and 5000 ft. of 36-in. pipe for industrial line. Ed Gooch is city engineer.

Reinforcing Steel

Awards of 7,150 tons; 6,250 tons in new projects

AWARDS

ATLANTIC STATES

3000 Tons, Brooklyn, Navy Yard warehouse and office building, to Bethlehem Steel Co., Bethlehem, Pa., through Turner Construction Co.
200 Tons, New Britain, Conn., housing project, to Republic Steel Co., Southern New England Construction Co., Inc., Hartford, Conn., contractor.

SOUTH AND CENTRAL

700 Tons, East St. Louis, Ill., Cargill Co. elevator, to Laclede Steel Co., St. Louis, through H. G. Onstad, contractor.
600 Tons, Newport News, Va., Newport News Shipbuilding & Dry Dock Co., pier, to Bethlehem Steel Co., Bethlehem, Pa., through McLean Construction Co.
440 Tons, Jeffersonville, Ind., Government warehouse, to American Builders' Supply Co., Louisville, Ky., through George H. Rommell, Louisville, general contractor.
186 Tons, State of Louisiana, mesh for State highway project No. 2608, to Truscon Steel Co., Youngstown, through Central Contracting Co.
170 Tons, Marinette, Wis., bridge, to Bethlehem Steel Co., Bethlehem, Pa.
151 Tons Barberton, Ohio, expansion for Columbia Chemical Co., to Truscon Steel Co., Youngstown.
110 Tons, Lorain County, Ohio, bar mats for State highway project No. 191, to Truscon Steel Co., Youngstown, through Ohio Engineering Co.

WESTERN STATES

360 Tons, Honolulu, T. H., Sears, Roebuck & Co. store, to Bethlehem Steel Co., through C. Wooley, Honolulu, contractor.
315 Tons, Zillah, Wash., Yakima project (Invitation A-33965-A), to Bethlehem Steel Co., San Francisco.
120 Tons, Mills, Wyo., bureau of reclamation project to Pacific Iron & Steel Co., Los Angeles.
100 Tons, Fresno, Cal., student union building, Fresno State College, to Truscon Steel Co., San Francisco, through James I. Barnes Construction Co., Santa Monica, Cal.

PENDING REINFORCING BAR PROJECTS

ATLANTIC STATES

500 Tons, Philadelphia, warehouses for Quartermasters' Depot, Wark Co., general contractors.
400 Tons, New York, East River Drive, contract No. 34; bids in.
240 Tons, Philadelphia, buildings for Navy Yard; Hughes-Foulkrod Co., contractor.
180 Tons, Allegheny County, Pa., highway, R-187-R-395; bids Sept. 6.
120 Tons, Syracuse, N. Y., Greyhound bus terminal.
100 Tons, Buffalo, Greyhound bus terminal.
100 Tons, Cheektowaga, N. Y., plant addition for Spencer Lens Co.; Gillmore-Carmichael-Olson Co., Cleveland, general contractors.
Unstated tonnage, Buffalo, 6,000,000-bushel grain elevator for Cargill, Inc.; H. G. Onstad, Chicago, general contractor.

SOUTH AND CENTRAL

900 Tons, Cleveland, Outhwaite Homes housing project; bids Sept. 16.
700 Tons, Riverton, Va., three bridges; bids Sept. 5.
300 Tons, Hutchinson, Kan., elevator.
275 Tons, Chicago, subway station, section D-2-C; bids Sept. 12.
246 Tons, Rutledge, Tex., Colorado River project (Invitation A-46, 938-A); bids Sept. 6.
200 Tons, Toledo, Ohio, Albertus Brown Homes housing project; Weinstein Construction Co., low bidder.
200 Tons, Milwaukee, Kurth Malting Co.

WESTERN STATES

1500 Tons, San Pedro, Cal., buildings only. Fleet Operating Base; Guy F. Atkinson Co., San Francisco, and George Pollock Co. Sacramento, Cal., joint contractors.
148 Tons, Pateros, Wash., Columbia Basin project (Invitation 38492-A); bids in.
118 Tons, Los Angeles, gunite mesh for Metropolitan Water District (Specification 344); bids Sept. 11.

Cast Iron Pipe

Cranston, R. I., will borrow $100,000 for sewerage purposes. Project involves 265 tons of cast iron pipe.

Shelburne, Vt., has awarded 250 tons of 6 and 8-in. pipe to Warren Foundry & Pipe Corp.

Houlton, Me., has purchased 4500 ft. of 12-in. pipe from United States Pipe & Foundry Co.

Brockton, Mass., has purchased 150 tons of 6-in. pipe from Warren Foundry & Pipe Corp.

Holyoke, Mass., has placed a round tonnage of 12-in. pipe with R. D. Wood Co.

Mooresville, N. C., has approved plans for pipe line extensions in water system and other waterworks installation, including new 200,000-gal. steel standpipe. Cost close to $90,000. Work is scheduled to begin late this month. Also will make extensions and improvements in sewer system to cost about $60,000. R. S. Dickson, 3701 Briarcliffe Place, Charlotte, N. C., is consulting engineer.

Tampa, Fla., plans pipe line extensions and replacements in water system and other waterworks installation, including new pipe line from water station on Hillsborough River to central city district for second main supply line. Latter to cost about $500,000, with entire project to total close to $2,000,000.

Ferriday, La., plans pipe line extensions in water system and other waterworks installation, including filtration plant. Cost about $45,000. Swanson, McGraw & Hooper, Balter Building, New Orleans, are consulting engineers.

Helena, Mont., plans pipe line extensions in water system, including new 28-in. line about 20,000 ft., from Woolston water reservoir to Yaw Yaw district for main supply, and miscellaneous waterworks installation. Proposed to ask bids early in October. V. N. Kessler is city engineer.

Prices of Finished Iron and Steel...

Steel prices on these pages are f.o.b. basing points (in cents per lb.) unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

Basing Point → / Product ↓	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars	Pacific Ports, Cars	DELIVERED TO Detroit	New York	Philadelphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.20¢	2.34¢	2.27¢
Cold rolled[1]	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.74¢	3.67¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.45¢	3.71¢	
Long ternes[2]	3.80¢		3.80¢									4.55¢			
Wrought iron	4.75¢														
STRIP															
Hot rolled[3]	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢		
Cold rolled[4]	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester = 3.00¢)					2.90¢		
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢								
Commodity C-R	2.95¢			2.95¢			2.95¢	(Worcester = 3.35¢)					3.05¢		
TIN PLATE Standard cokes (Per 100-lb. base box)	$5.00	$5.00	$5.00						$5.10						
BLACK PLATE 29 gage[5]	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢ (10)			
TERNES, M'FG Special coated (Per base box)	$4.30		$4.30						$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth = 2.25¢)			2.50¢	2.80¢	2.25¢	2.49¢	2.47¢
Rail steel[6]	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢					2.40¢	2.70¢			
Reinforcing (billet)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢	2.25¢		
Reinforcing (rail)[7]	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢				2.40¢	2.45¢	2.15¢		
Cold finished[8]	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢							2.70¢		
PLATES									(Coatesville and Claymont = 2.10¢)						
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢			2.45¢	2.65¢		2.29¢	2.15¢
Wrought iron	3.80¢														
Floor plates	3.35¢	3.35¢									3.70¢	4.00¢		3.71¢	
Alloy	3.25¢	3.25¢													
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	(Bethlehem = 2.10¢)				2.45¢	2.75¢		2.27¢	2.215¢
SPRING STEEL C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢			(Worcester = 3.00¢)								
0.51 to 0.75 Carbon	4.30¢			4.30¢			(Worcester = 4.50¢)								
0.76 to 1.00 Carbon	6.15¢			6.15¢			(Worcester = 6.35¢)								
1.01 to 1.25 Carbon	8.35¢			8.35¢			(Worcester = 8.55¢)								
WIRE[9]															
Bright	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester = 2.70¢)								
Galvanized	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester = 2.70¢)								
Spring	3.20¢	3.20¢		3.20¢			(Worcester = 3.30¢)								
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢					2.85¢	2.95¢			
IRON BARS															
Common		2.25¢			(Terre Haute, Ind. = 2.15¢)										
Refined	3.75¢														
Wrought	4.40¢														

[1] Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. [2] Unassorted 8-lb. coating. [3] Widths up to 12 in. [4] Carbon 0.25 per cent and less. [5] Applies to 29 gage within certain width and length limitations. [6] For merchant trade. [7] Straight lengths as quoted by distributers. [8] Also shafting. For quantities of 20,000 to 39,999 lb. [9] Carload lots to manufacturing trade. [10] Boxed.

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (Rerolling only). Prices delivered Detroit are $2 higher f.o.b. Duluth, billets only, $2 higher.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

Shell Steel

Basic open hearth shell steel f.o.b. Pittsburgh and Chicago.

	Per Gross Ton
3 in to 8 in.	$54.00
8 in. to 12 in.	52.00
12 in to 18 in.	54.00
18 in. and over	56.00

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity. This type of steel is for hot rolled sections used for the making of shells and includes rounds, round squares, and special sections.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(No. 5 to 9/32 in.)	*Per Lb.*
Pittsburgh, Chicago, Cleveland	2.00c.
Worcester, Mass.	2.10c.
Birmingham	2.00c.
San Francisco	2.50c.
Galveston	2.25c.

9/32 in. to 47/64 in., $3 a net ton higher. Quantity extras apply.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh; Package, 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	$6.00	$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00
25-lb. coating I.C.	8.00	16.00
30-lb. coating I.C.	8.63	17.25
40-lb. coating I.C.	9.75	19.50

WIRE PRODUCTS

(To the Trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham)

	Base per Keg
Standard wire nails	$2.55
Coated nails	2.55
Cut nails, carloads	3.85

	Base per 100 Lb.
Annealed fence wire	$3.05

	Base Column
Woven wire fence*	67
Fence posts (carloads)	69
Single loop bale ties	56
Galvanized barbed wire†	70
Twisted barbless wire	70

*15½ gage and heavier. †On 80-rod spools in carload quantities.

Note: Birmingham base same on above items, except spring wire.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
Machine and carriage bolts:	
½ in. and 6 in. and smaller	68½
Larger and longer up to 1 in.	66
1⅛ in. and larger	64
Lag bolts	66
Plow bolts, Nos. 1, 2, 3, and 7	68½
Hot pressed nuts; c.p.c., t-nuts; square, hex., blank or tapped:	
½ in. and smaller	67
9/16 in. to 1 in. inclusive	64
1⅛ in. to 1½ in. inclusive	62
1⅝ in. and larger	60

On above items, excepting plow bolts, additional allowance of 10 per cent for full container quantities.

On all of the above items there is an additional 5 per cent allowance for carload shipments.

Semi-fin. hexagon nuts	U.S.S.	S.A.E.
½ in. and smaller	67	70
9/16 to 1 in.	64	65
1⅛ in. through 1½ in.	62	62
1⅝ in. and larger	60	60

In full container lots, 10 per cent additional discount.

Stove bolts, packages, nuts loose	75 and 10
Stove bolts in packages, with nuts attached	75
Stove bolts in bulk	83½

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York, lots of 200 lb. or over.

Large Rivets

(½ in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$3.40

Small Rivets

(7/16 in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	65 and 10

Cap and Set Screws

	Per Cent Off List
Milled hexagon head, cap screws, 1 in. dia. and smaller	50 and 10
Milled headless set screws, cut thread ¼ in. and larger	64
3/16 in. and smaller	73
Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller	70
Upset set screws, cup and oval points	75
Milled studs	52

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

NON-FERROUS PRICES

Cents per lb. for early delivery

	Aug. 28	Aug. 29	Aug. 30	Aug. 31	Sept. 3
Copper, Electrolytic[1]	11.00	11.00	11.00	11.00	11.00
Copper Lake	11.00	11.00	11.00	11.00	11.00
Tin, Straits, New York	50.625	50.50	50.50	....	50.50
Zinc, East St. Louis[2]	6.50	6.50	6.50	6.50	6.50
Lead, St. Louis[3]	4.75	4.75	4.75	4.75	4.75

[1] Mine producers' quotations only, delivered Conn. Valley. Deduct ¼c. for approximate New York delivery price. [2] Add 0.39c. for New York delivery. [3] Add 0.15c. for New York delivery.

Warehouse Products

Cents per lb., Delivered

Tin	New York	Cleveland
Straits pig	51.75	53.50
Copper		
Electro	12.25	12.125
Castings	12.50	11.875
H. R. sheets*	19.62	19.62
Seamless tubes*	20.12	20.12
Brass		
Yellow, sheets*	18.23	18.23
Yellow, rods*	13.26	13.26
Seamless tubes*	20.98	20.98
Zinc		
Slabs	7.60	7.75
Sheets, No. 9 casks	12.50	14.00
Lead		
American pig	6.00	5.40
Bar	7.95	8.00
Cut sheets	8.15	8.15
Antimony		
Asiatic	16.00	17.00
Aluminum		
Virgin, 99%	20.00	21.00
No. 1 remelt., 98-99%	18.00	18.50
Solder		
½ and ½	31.25	31.75
Babbitt		
Anti-friction grade	23.50	21.25

Old Metals

Cents per lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators. Selling prices are those charged to consumers after the metal has been prepared for their use.

Copper	Dealers' Buying Prices	Dealers' Selling Prices
Hvy. crucible	8.750	9.375
Hvy. and wire	7.750	8.125
Light and bottoms	6.750	7.25
Brass		
Heavy	4.875	5.380
Light	3.875	4.625
No. 1 yel. turn.	4.50	5.50
No. 1 red or compo. turnings	7.125	7.625
Hvy. Mach. compo.	7.375	8.00
Lead		
Heavy	3.875	4.250
Aluminum		
Cast	8.00	9.00
Sheet	13.00	14.00
Zinc	3.75	4.50

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 18c.-19c. a lb.; No. 12 remelt No. 2 standard, 18c.-19c. a lb. NICKEL, electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt: Asiatic, 16.50c. a lb., New York; American, 13c. a lb., f.o.b. smelter. QUICKSILVER, $183-$185 per flask of 76 lb. BRASS INGOTS, commercial 85-5-5-5, 11.75c. a lb.

•These prices, which are also for delivery from Chicago warehouses, are quoted with the following percentages allowed off for extras: on copper sheets, 33⅓; on brass sheets and rods, 40; on brass tubes, 33⅓, and copper tubes, 40.

ALLOY STEEL

Alloy Steel Blooms, Billets and Slabs

Base per gross ton, f.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo or Bethlehem.....$54.00

Alloy Steel Bars

Base per pound, f.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade ..... 2.70c.
Delivered, Detroit ..... 2.80c.

S.A.E. Series Numbers	Alloy Differential, per 100 Lb.
2000 (1.5 Ni)	$0.35
2100 (1.5 Ni)	0.75
2300 (3.5 Ni)	1.55
2500 (5 Ni)	2.25
3100 Ni-Cr	0.70
3200 Ni-Cr	1.35
3300 Ni-Cr	3.80
3400 Ni-Cr	3.20
4100 Cr-Mo (0.15 to 0.25 Mo.)	0.55
4100 Cr-Mo (0.25 to 0.40 Mo.)	0.75
x4340 Cr-Ni-Mo	1.65
4340 Cr-Ni-Mo	1.85
4600 Ni-Mo (0.2-0.3 Mo, 1.5-2 Ni)	1.10
5100 (0.60-0.90 Cr)	0.35
5100 (0.80-1.10 Cr)	0.45
5100 Cr spring steel	0.15
52-100 Cr. (electric furnace)	2.60
6100 Cr-V bar	1.20
6100 Cr-V spring steel	0.85
Cr-Ni-V	1.50
C-V	0.85

The above differentials are for hot rolled finished products. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base.

Alloy Cold-Finished Bars

Base per pound, f.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.35c. Delivered Detroit, 3.45c., carlots.

STAINLESS AND HEAT-RESISTANT ALLOYS

(Base prices, cents per lb., f.o.b. Pittsburgh)

Chromium-Nickel

No.	304	302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium

No.	410	430	442	446
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
H't strip	17.00c.	17.50c.	24.00c.	35.00c.
C'ld st.	22.00c.	22.50c.	32.00c.	52.00c.

TOOL STEEL

(F.o.b. Pittsburgh)

	Base per Lb.
High speed	67c.
High-carbon-chromium	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

ELECTRICAL SHEETS

(F.o.b. Pittsburgh)

	Base per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

Silicon strip in coils—Sheet price plus silicon sheet extra width extra plus 25c. per 100 lb. for coils. Pacific ports add 70c. a 100 lb.

CAST IRON WATER PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. dock, San Francisco or Los Angeles or Seattle	56.00

Class "A" and gas pipe, $3 extra; 4-in. pipe is $3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is $45 at Birmingham and $53.80 delivered Chicago.

Another ERIE...
For Defense -- 4000 lb. Erie Steam Drop Hammer forging aircraft parts of chrome-nickel-molybdenum steel at Transue & Williams Steel Forging Corp. . . . Tougher, cleaner forgings at reasonable costs . . . The result of your selection of Erie Steam and Board Drop Hammers, Single and Double Frame Forging Hammers in sizes to fit your work. Write for catalog.
ERIE
ERIE FOUNDRY CO.
ERIE, PENNSYLVANIA, U. S. A.
DETROIT 335 Curtis Bldg.
CHICAGO 549 Washington Blvd.
INDIANAPOLIS 335 Postal Station Bldg.
FRANCE Fenwick, S. A.
CANADA John Bertram & Sons Co., Ltd.
ENGLAND Burton, Griffiths & Co., Ltd.
ERIE BUILDS Dependable HAMMERS

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall.

(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

	Seamless Cold Drawn	Seamless Hot Rolled	Lap Weld. Hot Rolled
1 in. o.d.13 B.W.G.	$9.01	$7.82	....
1¼ in. o.d.13 B.W.G.	10.67	9.26	....
1½ in. o.d.13 B.W.G.	11.70	10.23	$9.72
1¾ in. o.d.13 B.W.G.	13.42	11.64	11.06
2 in. o.d.13 B.W.G.	15.03	13.04	12.38
2¼ in. o.d.13 B.W.G.	16.76	14.54	13.79
2¼ in. o.d.12 B.W.G.	18.45	16.01	15.16
2½ in. o.d.12 B.W.G.	20.21	17.54	16.58
2¾ in. o.d.12 B.W.G.	21.42	18.59	17.54
3 in. o.d.12 B.W.G.	22.48	19.50	18.35
3½ in. o.d.11 B.W.G.	28.37	24.62	23.15
4 in. o.d.10 B.W.G.	35.20	30.54	28.66
4½ in. o.d.10 B.W.G.	43.04	37.35	35.22
5 in. o.d. 9 B.W.G.	54.01	46.87	44.25
6 in. o.d. 7 B.W.G.	82.93	71.96	68.14

Extras for less carload quantities:

40,000 lb. or ft. over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

(F.o.b. Pittsburgh only on wrought iron pipe)

Base Price=$200 Per Net Ton

Butt Weld

Steel	Black	Galv.
⅛ in.	56	36
¼ to ⅜ in.	59	43½
½ in.	63½	54
¾ in.	66½	58
1 to 3 in.	68½	60½

Wrought Iron	Black	Galv.
¼ and ⅜ in.	+9	+30
½ in.	24	6½
¾ in.	30	13
1 and 1¼ in.	34	19
1½ in.	38	21½
2 in.	37½	21

Lap Weld

Steel		
2 in.	61	52½
2½ and 3 in.	64	55½
3½ to 6 in.	66	57¼
7 and 8 in.	65	55½
9 and 10 in.	64½	55
11 and 12 in.	63½	54

Wrought Iron		
2 in.	30½	15
2½ to 3½ in.	31½	17½
4 in.	33½	21
4½ to 8 in.	32½	20
9 to 12 in.	28½	15

Butt weld, extra strong, plain ends

Steel	Black	Galv.
⅛ in.	54½	41½
¼ to ⅜ in.	56½	45½
½ in.	61½	53½
¾ in.	65½	57½
1 to 3 in.	67	60
Wrought Iron		
¼ and ⅜ in.	+10	+43
½ in.	25	9
¾ in.	31	15
1 to 2 in.	38	22½

Lap weld, extra strong, plain ends

Steel		
2 in.	59	51½
2½ and 3 in.	63	55½
3½ to 6 in.	66½	59
7 and 8 in.	65½	56
9 and 10 in.	64½	55
11 and 12 in.	63½	54
Wrought Iron		
2 in.	33½	18½
2½ to 4 in.	39	25½
4½ to 6 in.	37½	24
7 and 8 in.	38½	24½
9 to 12 in.	32	20½

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher, on all butt weld 8 in. and smaller.

Only DINGS

Gives you *all* these advantages in a Magnetic Pulley for removing iron from foundry sand!

1. **Bronze Spacers and Coil Covers**—these do not short-circuit lines of force, reduce pulling power! (No other pulley is built this way. See what this means—Make the test shown.)

2. **Air-Cooled Construction**—a hot separator won't separate—the Dings pulley has more heat-radiating surface than any other pulley. Note the serrated radial openings, the longitudinal openings, the radiating vanes at the hub!

3. **Separate Coil Sections**—each coil section is cast separately, is a separate magnet. This insures maximum flux density, tremendous power!

4. **Mechanically Locked Coils**—failure from coil movement is eliminated. Coils are wound by experts according to A.I.E.E. standards.

5. **Waterproof Construction**—coils are impregnated with special insulating compound.

These features mean greater separating power, cleaner foundry sand, lower sand conditioning costs, better castings, more reclaimed metal. Write for catalog today.

Suspend a steel screw from string attached to support. Place steel spacer piece across pole ends of ordinary magnet—bronze or brass spacer across ends of similar magnet. With screw in center, move magnets toward each other at equal rate of motion.

Snap! Screw will jump and be firmly held at the bronze or brass spacer. Steel spacers short circuit magnetic lines of force and weaken the magnetic pull. Bronze spacers preserve magnetic strength—assure a stronger pull.

Bronze spacer rings are standard in Dings separators—other manufacturers use steel. Reason enough why Dings separators are the strongest separators on the market, size for size.

DINGS MAGNETIC SEPARATOR COMPANY

727 Smith Street Milwaukee, Wisconsin

Dings MAGNETIC SEPARATION HIGH INTENSITY

LIFTING MAGNETS • MAGNETIC CLUTCHES • SEPARATORS

ORES

Lake Superior Ores

Delivered Lower Lake Ports

	Per Gross Ton
Old range, bessemer, 51.50%..	$4.75
Old range, non-bessemer, 51.50%	4.60
Mesaba, bessemer, 51.50%....	4.60
Mesaba, non-bessemer, 51.50%	4.45
High phosphorus, 51.50%.....	4.35

Foreign Ores*

C.i.f. Philadelphia or Baltimore, Exclusive of Duty

	Per Unit
Algerian, low P, Cu free, dry, 55 to 58% Fe	12c.
Caucasian, washed, 52% Mn.	60c.
African, Indian, 44 to 48% Mn.	51c.
African, Indian, 49 to 51% Mn.	56c.
Brazilian, 46 to 48% Mn.	53c.
Cuban, del'd, duty free, 51% Mn.	72c.

	Per Short Ton Unit
Tungsten, Chinese, Wolframite, duty paid, delivered	Nom.
Tungsten, domestic scheelite, delivered	Nom.
Chrome ore, lump c.i.f. Atlantic Seaboard, per gross ton:	
South African (low grade)	Nom.
Rhodesian, 45%	$23.50
Rhodesian, 48%	27.50

RAILS, TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., gross ton	$40.00
Angle bars, 100 lb.	2.70

F.o.b. Basing Points

Light rails (from billets), gross ton	$40.00
Light rails (from rail steel), gross ton	39.00

	Base per Lb.
Cut spikes	3.00c.
Screw spikes	4.55c.
Tie plates, steel	2.15c.
Tie plates, Pacific Coast	2.30c.
Track bolts, steam railroads	4.15c.
Track bolts, discount to jobbers all sizes (per 100 counts)	65-5

Basing points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minneaqua, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond, Va.

FLUORSPAR

	Per Net Ton
Domestic washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail	$20.00 to $21.00
Domestic, f.o.b. Ohio River landing barges	20.00 to 21.00
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines	20.50 to 21.00
Foreign, 85% calcium fluoride, not over 5% Si., c.i.f. Atlantic ports, duty paid	25.00 to 25.50
Domestic No. 1 ground bulk, 96 to 98%, calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	31.00
As above, in bags, f.o.b. same mines	32.60

REFRACTORIES

Fire Clay Brick

	Per 1000 f.o.b. Works
Super-duty brick, at St. Louis	$60.80
First quality Pennsylvania, Maryland, Kentucky, Missouri and Illinois	47.50
First quality, New Jersey	52.50
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	42.75
Second quality, New Jersey	49.00
No. 1 Ohio	39.90
Ground fire clay, per ton	7.10

Silica Brick

Pennsylvania	$47.50
Chicago District	55.10
Birmingham	47.50
Silica cement, net ton (Eastern)	8.55

Chrome Brick

	Net per Ton
Standard f.o.b. Baltimore, Plymouth Meeting and Chester	$50.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	50.00

Magnesite Brick

Standard f.o.b. Baltimore and Chester	$72.00
Chemically bonded, f.o.b. Baltimore	61.00

Grain Magnesite

Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	(—)*
Domestic, f.o.b. Baltimore and Chester in sacks	$40.00
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00

*None available.

Precise Metallurgical Control of large heats or small . . .

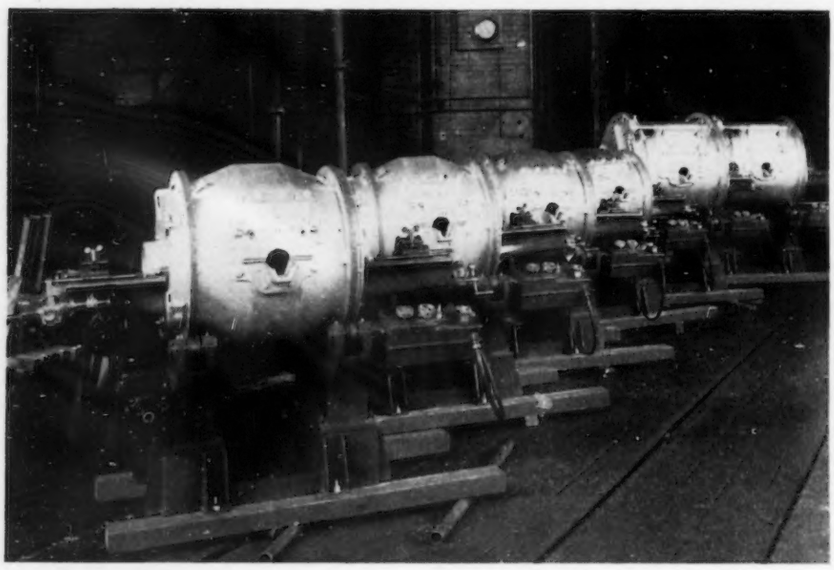
The Detroit Rocking Electric Furnace is first of all a metallurgical tool. Because of its thorough mixing of the bath, absence of oxidation and accurate control of time, temperature and analysis, it produces the highest quality of product under precision control.

Detroit Furnaces are today being used for melting practically all commercial alloys—ferrous and non-ferrous—and for making special analyses which are impossible or impractical with other available melting equipment.

The Detroit Furnace is also a valuable utility tool. It may be used any number of hours per day on large heats or small. Heats can be taken off on short notice with a variety of alloys melted one after another all day long. It may be used as a holding or dispensing unit—holding special alloys at tapping temperature thus adapting itself to special production processes.

Write today for further facts on how a Detroit Rocking Electric Furnace means added profits for you.

(Below) A recent shipment of six Detroit Electric Furnaces—all completely automatic



DETROIT ELECTRIC FURNACE DIVISION

KUHLMAN ELECTRIC COMPANY • BAY CITY MICHIGAN

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload).....$120.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%.....$36.00
Domestic, 26 to 28%..... 49.50

Electric Ferrosilicon

Per Gross Ton, Delivered, Lump Size

50% (carload lots, bulk).....$74.50*
50% (ton lots, packed)..... 87.00*
75% (carload lots, bulk).....135.00*
75% (ton lots, packed).....151.00*

Bessemer Ferrosilicon

Per Gross Ton, F.o.b. Jackson, Ohio

10.00 to 10.50%.....$33.50

For each additional 0.50% silicon up to 12%, 50c. per ton is added. Above 12% add 75c. per ton.

For each unit of manganese over 2%, $1 per ton additional.

Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Silvery Iron

Per Gross Ton, F.o.b. Jackson, Ohio

5.00 to 5.50%.....$27.50

For each additional 0.5% silicon up to 12%, 50c. a ton is added. Above 12% add 75c. a ton.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Ferrochrome

Per Lb. Contained Cr., Delivered Carlots, Lump Size, on Contract

4 to 6% carbon.....11.00c.
2% carbon .....17.50c.
1% carbon .....18.50c.
0.10% carbon .....20.50c.
0.06% carbon .....21.00c.

Spot prices are ¼c. per lb. of contained chromium higher.

Silico-Manganese

Per Gross Ton, Delivered, Lump Size, Bulk, on Contract

3% carbon $113.00*
2.50% carbon 118.00*
2% carbon 123.00*
1% carbon 133.00*

Other Ferroalloys

Ferrotungsten, per lb. contained W, del. carload..... $2.00
Ferrotungsten, 100 lb. and less 2.25
Ferrovanadium, contract, per lb. contained V., del'd $2.70 to $2.90†
Ferracolumbium, per lb. contained columbium, f. o. b. Niagara Falls, N. Y., ton lots ..... $2.25†
Ferrocarbontitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace, carload and contract, per net ton.....$142.50
Ferrocarbontitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton.....$157.50
Ferrophosphorus, electric or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage, freight equalized with Rockdale, Tenn., per gross ton 58.50
Ferrophosphorus, electrolytic 23-26% in carlots, f.o.b. Monsanto (Siglo), Tenn., 24%, per gross ton, $3 unitage, freight equalized with Nashville 75.00
Ferromolybdenum, per lb. Mo, f.o.b. furnace..... 95c.
Calcium molybdate, per lb. Mo, f.o.b. furnace ..... 80c.
Molybdenum oxide briquettes 48-52% Mo, per lb. contained Mo, f.o.b. Langeloth, Pa. 80c.

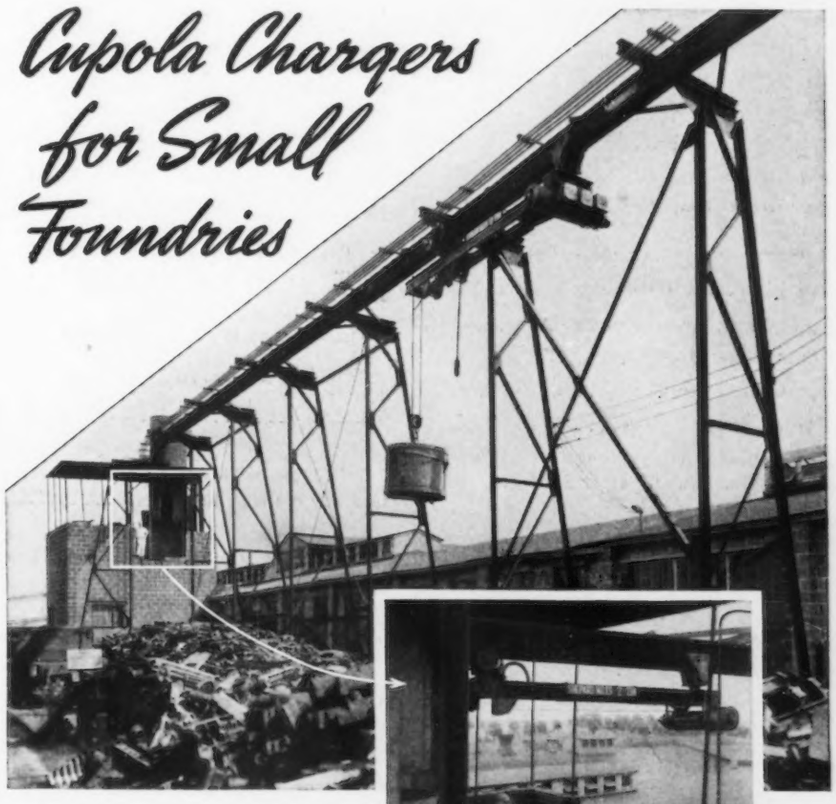
•Spot prices are $5 per ton higher.
†Spot prices are 10c. per lb. of contained element higher.

FUEL OIL

Per Gal.

No. 3, f.o.b. Bayonne, N. J.....4.10c.
No. 6, f.o.b. Bayonne, N. J.....2.98c.
No. 5 Bur. Stds., del'd Chicago..3.25c.
No. 6 Bur. Stds., del'd Chicago..2.75c.
No. 3 distillate, del'd Cleveland.5.25c.
No. 4 industrial, del'd Cleveland.5.00c.
No. 5 industrial, del'd Cleveland.3.75c.
No. 6 industrial, del'd Cleveland.3.25c.

Cupola Chargers for Small Foundries



● Mechanical cupola charging systems are now available for small foundries with daily melts of 15 to 30 tons.

No need for an expensive cupola enclosure or charging floor. An inexpensive runway to carry the charger and an operator's platform at the cupola door is all the construction necessary.

Foundrymen who seek better metal at lower costs—no matter what the daily tonnage may be—can obtain complete information by writing to Montour Falls.

A COMPLETE LINE OF CRANES & HOISTS

SHEPARD NILES CRANE & HOIST CORP.

356 SCHUYLER AVENUE... MONTOUR FALLS, N. Y.

COKE

Per Net Ton

Furnace, f.o.b. Connellsville, prompt .....$4.50 to $4.75

Foundry, f.o.b. Connellsville, prompt .....$5.25 to 5.50

F'dry, by-product, Chicago.... 10.50

F'dry, by-product, New England 12.50

Foundry, by-product, Newark or Jersey City .....$11.30 to $11.90

F'dry, by-product, Philadelphia 11.13

F'dry, by-product, Cleveland... 11.05

F'dry, by-product, Cincinnati.. 10.50

Foundry, Birmingham 7.50

F'dry, by-product, St. Louis $10.75 to $11.00

Foundry, from Birmingham, f.o.b. cars dock Pacific ports.....$14.75

BRITISH

British

Per Gross Ton, f.o.b. United Kingdom Ports

Ferromanganese, export. £17 18s.

Tin plate, per base box 32s. to 33s.

Steel bars, open hearth £13 9s.

Beams, open hearth.... £12 2s. 6d.

Channels, open hearth.. £12 2s. 6d.

Angles, open hearth.... £12 2s. 6d.

Black sheets, No. 24 gage £18 17s. 6d. max.*; £18 17s. 6d. min.**

Galvanized sheets, No. 24 gage £19 10s. max.*; £19 10s. min.**

*Empire markets only.
**Other than Empire markets.

PIG IRON (Per Gross Ton)

Prices delivered various consuming points indicated by bold italics

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phos.
Boston	***$24.50***	***$24.00***	***$25.50***	***$25.00***	.....
Brooklyn	***26.50***	.....	.....	***27.00***	.....
Jersey City	***25.53***	***25.03***	***26.53***	***26.03***	.....
Philadelphia	***24.84***	***24.34***	***25.84***	***25.34***	.....
Bethlehem, Pa.	$24.00	$23.50	$25.00	$24.50	.....
Everett, Mass.	24.00	23.50	25.00	24.50	.....
Swedeland, Pa.	24.00	23.50	25.00	24.50	.....
Steelton, Pa.	.....	23.50	.....	.....	28.50
Birdsboro, Pa.	24.00	23.50	25.00	24.50	28.50
Sparrows Point, Md.	24.00	23.50	.....	.....	.....
Erie, Pa.	23.00	22.50	24.00	23.50	.....
Neville Island, Pa.	23.00	22.50	23.50	23.00	.....
Sharpsville, Pa.	23.00	22.50	23.50	23.00	.....
Buffalo	23.00	22.00	24.00	23.50	28.50
Cincinnati	***23.44***	***23.61***	.....	***24.11***	.....
Canton, Ohio	***24.39***	***23.89***	***24.89***	***24.39***	.....
Mansfield, Ohio	***24.94***	***24.44***	***25.44***	***24.94***	.....
St. Louis	***23.50***	***23.02***	.....	.....	.....
Chicago	23.00	22.50	23.50	23.00	.....
Granite City, Ill.	23.00	22.50	23.50	23.00	.....
Cleveland	23.00	22.50	23.50	23.00	.....
Hamilton, Ohio	23.00	22.50	.....	23.00	.....
Toledo	23.00	22.50	23.50	23.00	.....
Youngstown	23.00	22.50	23.50	23.00	.....
Detroit	23.00	22.50	23.50	23.00	.....
St. Paul	***25.63***	.....	***26.13***	***25.63***	.....
Duluth	23.50	.....	24.00	23.50	.....
Birmingham	19.38*	18.00	24.00	.....	.....
Los Angeles, San Francisco and Seattle	***27.50***	.....	.....	.....	.....
Provo, Utah	22.00	.....	.....	.....	.....
Montreal†	27.50	27.50	.....	28.00	.....
Toronto†	25.50	25.50	.....	26.00	.....

GRAY FORGE

Valley or Pittsburgh fce.....$22.50

CHARCOAL

Lake Superior fce.....$27.00
Delivered Chicago 30.34

Base prices are subject to an additional charge for delivery within the switching limits of the respective districts.

*Delivered prices on Southern iron for shipment to Northern points are 38c. a ton below delivered prices from nearest Northern basing point on iron with phosphorus content of 0.70 per cent and over. †On all grades 2.25 per cent silicon and under is base. For each 25 points of silicon over 2.25 per cent an extra of 25c. is charged.

WAREHOUSE PRICES

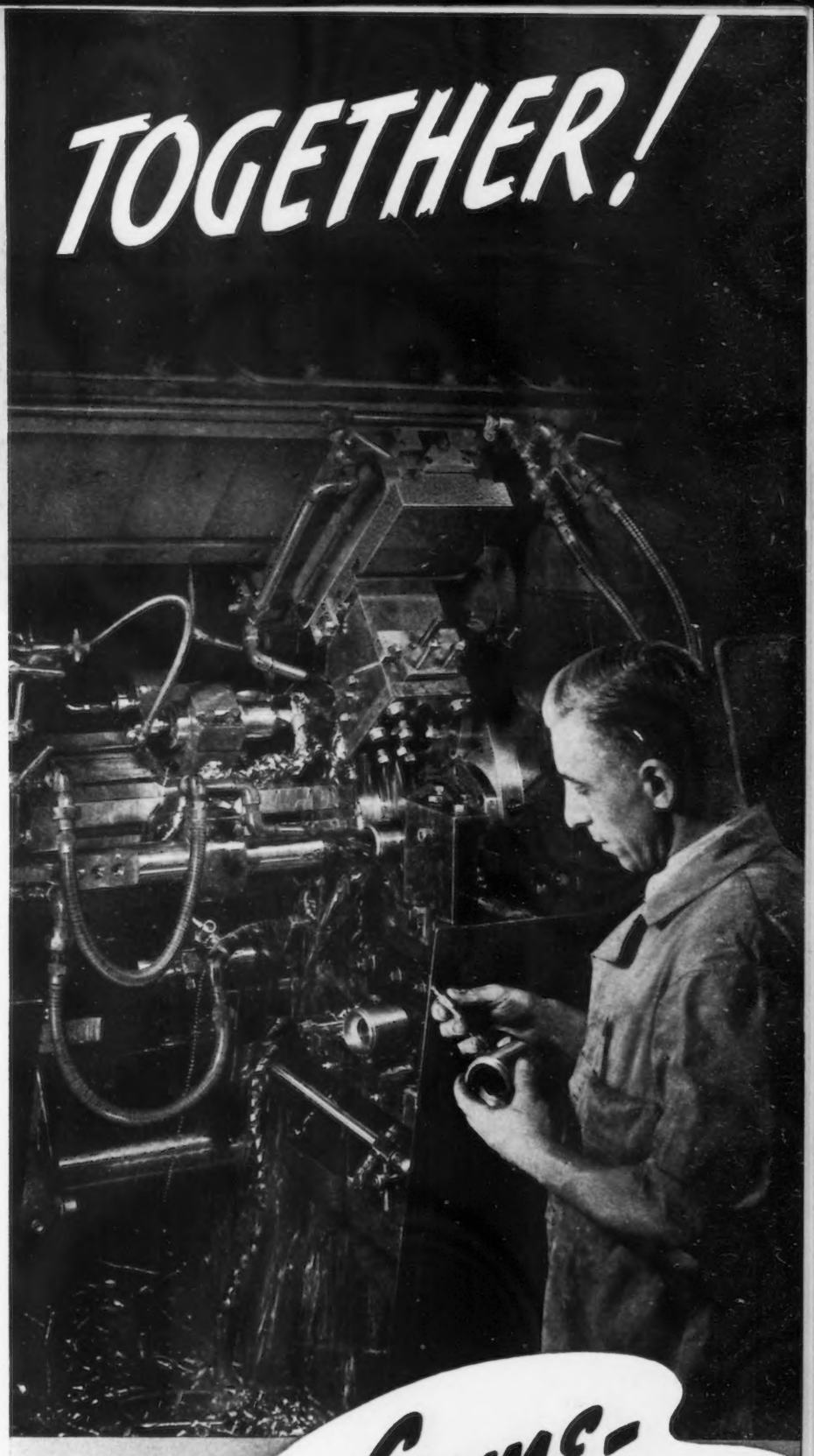
(Base Prices, Dollars per 100 lb., Delivered Metropolitan Areas)

	Pittsburgh	Chicago	Cleveland	Philadelphia	New York	Detroit	Buffalo	Boston	Birmingham	St. Louis	St. Paul	Milwaukee	Los Angeles
Sheets, hot rolled	$3.15	$3.05	$3.15	$3.35	$3.38	$3.23	$3.05	$3.51	$3.45	$3.18	$3.30	$3.48	$4.30
Sheets, cold rolled	....	4.10	4.05	4.05	4.40	4.30	4.30	4.58	....	4.12	4.35	4.43	6.50
Sheets, galvanized	4.75	4.60	4.42	4.50	4.30	4.64	4.00	4.66	4.75	4.95	4.75	4.98	5.25
Strip, hot rolled	3.40	3.40	3.30	3.75	3.76	3.48*	3.62	3.86	3.70	3.52	3.65	3.73	....
Strip, cold rolled	3.20	3.30	3.20	3.31	3.31	3.20	3.22	3.26	....	3.41	3.83	3.54	....
Plates	3.40	3.55	3.40	3.55	3.76	3.60	3.62	3.85	3.35	3.47	3.80	3.68	4.00
Structural shapes	3.40	3.55	3.58	3.55	3.75	3.65	3.40	3.85	3.55	3.47	3.80	3.68	4.00
Bars, hot rolled	3.35	3.50	3.25	3.85	3.84	3.43	3.35	3.98	3.50	3.62	3.75	3.63	4.15
Bars, cold finished	3.65	3.75	3.75	4.06	4.09	3.80	3.75	4.13	4.43	4.02	4.34	3.88	6.60
Bars, ht. rld. SAE 2300	7.20	7.10	7.30	7.31	7.35	7.42	7.10	7.50	....	7.47	7.45	7.33	9.40
Bars, ht. rld. SAE 3100	5.75	5.65	5.85	5.86	5.90	5.97	5.65	6.05	....	6.02	6.00	5.88	8.55
Bars, cd. drn. SAE 2300	8.15	8.15	8.15	8.56	8.59	8.45	8.15	8.63	....	8.52	8.84	8.38	10.65
Bars, cd. drn. SAE 3100	6.75	6.75	6.75	7.16	7.19	7.05	6.75	7.23	....	7.12	7.44	6.98	9.80

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb.; galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions: Chicago, galvanized sheets, 500 to 1499 lb.; Philadelphia, galvanized sheets, one to nine bundles, cold rolled sheets, 1000 to 1999 lb.; Detroit, galvanized sheets, 500 to 1499 lb.; Buffalo, cold rolled sheets, 500 to 1500 lb., galvanized sheets, 450 to 1499 lb.; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; Birmingham, hot rolled sheets, strip and bars, plates and shapes, 400 to 3999 lb., galvanized sheets, 500 to 1499 lb.; St. Louis, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb.; Milwaukee, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 150 to 499 lb.; New York, hot rolled sheets, 0 to 1999 lb., cold rolled sheets, 400 to 1499 lb.; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, shapes, cold rolled sheets, 300 to 1999 lb., galvanized sheets, 150 to 1049 lb. Extras for size, quality, etc., apply on above quotations. *12 gage and heavier, $3.23.

the pull is—

TOGETHER!



THEY TELL US that "things are happening" in this land of ours . . . that idleness is encouraged, thrift mocked, business solvency ridiculed. If this be true, then that minority is ever so small.

On the other hand, the National Acme organization stands solid and proud in its belief that among those whose bricks, mortar and equipment supply jobs and those whose heads and hands build and sell our products, there exists a united front.

This unity of purpose and action comes from a common understanding and appreciation of our right . . . the right to work and to profit, for homes, education, recreation.

For we know that it is under this American way of life that we have come to enjoy the highest living standards the world has ever known.

The pull is together . . . we will remain steadfast, come peace or strife.

Acme-Gridley

NATIONAL ACME

170 EAST 131ST STREET • CLEVELAND, O.

ME-GRIDLEY 4-6 AND 8 SPINDLE BAR AND CHUCKING AUTOMATICS • SINGLE SPINDLE AUTOMATICS • AUTOMATIC THREADING DIES
ND TAPS • SCREW MACHINE PRODUCTS • THE CHRONOLOG • LIMIT SWITCHES • POSITIVE CENTRIFUGE • CONTRACT MANUFACTURING

Sales Possibilities

. . . CONSTRUCTION, PLANT EXPANSION AND EQUIPMENT BUYING

North Atlantic

• **Socony-Vacuum Oil Co.,** 26 Broadway, New York, plans two-story addition to branch plant at Paulsboro, N. J., 78 x 110 ft., for engineering and technical service. Cost over $65,000 with equipment. Frederick G. Frost, 144 East Thirtieth Street, New York, is architect.

American Cyanamid Co., 30 Rockefeller Plaza, New York, has let general contract to Miller, Davis & Co., Kalamazoo, Mich., for new plant at Wallingford, Conn., where 275 acres recently was acquired, comprising main one and three-story unit, 162 x 222 ft., power house and machine shop, and other structures. It will be used for production of resin products for plastics manufacture. Cost close to $500,000 with equipment.

Commanding Officer, Ordnance Department, Watervliet Arsenal, Watervliet, N. Y., asks bids until Sept. 9 for 250 to 750 75-mm. howitzers (Circular 90), 250 to 750 90-mm. guns (Circular 98); until Sept. 12, 1000 to 3000 105-mm. howitzers (Circular 103).

Electric Boat Co., 40 Wall Street, New York, submarines, has let general contract to Mondelci & Benvenuti, 6 Elm Street, New London, Conn., for expansion in shipyard at Groton, Conn., including four new shipways, one-story shops for machine and other mechanical service, and other structures. Capacity of yard will be doubled. Cost over $3,500,000 with machinery.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Sept. 10 for motor-generators, control apparatus and spare parts (Schedule 2828) for Brooklyn, Philadelphia, Portsmouth, N. H., Norfolk and Mare Island Navy yards; 17 motor-driven, heavy-duty engine lathes (Schedule 2811) for Brooklyn, Mare Island and Puget Sound Navy yards.

Celanese Corp. of America, Inc., 180 Madison Avenue, New York, cellulose rayon products, has arranged for bond issue of $25,000,000 for expansion and improvements in mills at Amcelle, near Cumberland, Md., and Pearisburg, Va., including considerable new machihnery.

Sperry Corp., 40 Flatbush Avenue Extension, Brooklyn, manufacturer of gyroscopes and other scientific instruments and parts, has work under way on expansion and improvements and has leased additional space in industrial buildings. Estimated expenditure is $3,500,000.

Fritzsche Brothers, Inc., 76 Ninth Avenue, New York, chemicals, oils, etc., has let general contract to J. W. Ferguson Co., Paterson, N. J., for three-story and basement addition addition to plant at Clifton, N. J., 50 x 140 ft. Cost close to $100,000 with equipment.

Public Service Electric & Gas Co., Public Service Terminal Building, Newark, N. J., has authorized further expansion in steam-electric generating station at Burlington, N. J., supplementing a development program under way to increase capacity by 100,000-kw. New work will include another 100,000-kw. turbine-generator unit, boilers and other equipment to cost close to $11,500,000. Portion of fund noted will be used for new transmission lines, power substations and other facilities in Burlington and Trenton areas.

Baldt Anchor Chain & Forge Corp., Chester, Pa., has let general contract to Frank Kerr, 1100 Leiper Street, Eddystone, Pa., for one-story addition, and improvements in present plant. Cost close to $50,000 with equipment.

E. Keeler Co., West Street, Williamsport, Pa., boilers, steel stacks, grates, etc., has approved plans for three-story addition, and power house, on Church Street. Cost over $70,000 with equipment.

Oliver Farm Equipment Sales Co., Harrisburg, Pa., agricultural implements and machinery, plans rebuilding factory branch, service, storage and distributing plant recently damaged by fire. Loss over $250,000 with equipment.

Buffalo District

• **Jamestown Metal Equipment Co., Inc.,** Allen Street Extension, Jamestown, N. Y., automobile radiators and kindred products, has asked bids on general contract for new one-story plant, 240 x 700 ft. Cost over $450,000 with equipment. E. B. Card is company engineer in charge.

Solvay Process Co., Solvay Station, Syracuse, N. Y., plans expansion and modernization in plant at Hopewell, Va., including additional equipment for increased production of sodium nitrate and other specialties. Cost over $250,000 with machinery.

Geneva Forge, Inc., Geneva, N. Y., cutlery, has asked bids on general contract for one-story addition, 180 x 400 ft. Cost close to $100,000 with equipment. Alfred S. Alschuler, 28 East Jackson Boulevard, Chicago, is architect.

New England

• **New London Terminal Co.,** New London, Conn., plans new bulk oil storage and distributing terminal on waterfront, extending from Eastern Point Road to harbor district. It will include piers, docks, several one-story buildings, five 80,000-gal. steel tanks, pumping station, boiler house and other structures. Cost over $250,000 with equipment. Leo F. Caproni, 1221 Chapel Street, New Haven, Conn., is architect and engineer.

United Aircraft Corp., East Hartford, Conn., has let general contract to Turner Construction Co., 420 Lexington Avenue, New York, for one-story addition to plant of Hamilton Standard Propeller Division. This is part of expansion to include addition to Pratt & Whitney Division, aircraft engines and parts, entire project to cost close to $12,000,000 with machinery. Company also has plans for additions to plant of Vought-Sikorsky Division, Stratford, Conn., to double present capacity. Cost about $3,000,000 with equipment. Albert Kahn, Inc., New Center Building, Detroit, is architect and engineer.

Scovill Mfg. Co., Mill Street, Waterbury, Conn., brass, bronze and other metal products, has let general contract to Turner Construction Co., 420 Lexington Avenue, New York, for new power house, 85 x 85 ft. Cost about $110,000 with equipment.

Washington District

• **Purchasing and Contracting Officer,** Holabird Quartermaster Depot, Baltimore, asks bids until Sept. 19 for 11,258 axes, and same number of shovels and tool brackets, mattocks with handles, etc., respectively (Circular 398-57).

Glenn L. Martin Co., Baltimore, airplanes and parts, plans expansion comprising one-story units on neighboring site, providing over 1,500,000 sq. ft. additional floor space for parts production and assembling. Cost close to $20,000,000 with equipment.

Bureau of Yards and Docks, Navy Department, Washington, closes bids Sept. 11 for electric overhead traveling bridge cranes for Washington Navy Yard, drydock at South Boston, Philadelphia and Mare Island yards (Specifications 9962). Bids also asked (no closing date stated) for 11 40-ton and five 30-ton locomotive cranes for Philadelphia, Charleston, S. C., Mare Island and Norfolk yards (Specifications 10024).

Hercules Powder Co., Delaware Trust Building, Wilmington, Del., plans new plant for production of smokeless powder for War Department at Radford, Va., where Government is acquiring about 2500 acres. It will comprise one and multi-story buildings, power house, pumping station, machine shops, administration building and other structures. Plant will be constructed and operated by company under cost-plus contract with Government, which will hold title to property. Cost about $25,000,000.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Sept. 10 for 21 motor-driven engine lathes for Portsmouth, N. H., Norfolk, Brooklyn, Charleston and Puget Sound Navy yards (Schedule 2833), 12 motor-driven woodworking machines for Jacksonville and Miami, Fla., New York, Corpus Christi, Tex., and Tongue Point, Ore., Naval stations (Schedule 2852), iron pipe fittings (Schedule 2788), motor-driven horizontal boring, drilling and milling machine (Schedule 2822), five motor-driven milling machines (Schedule 2850), blast helmets (Schedule 2835) for Eastern and Western yards; until Sept. 13, 56,250 ammunition boxes, including inspection gages for Portsmouth, Va., and Mare Island yards (Schedule 2846).

South Atlantic

• **Florida Power & Light Corp.,** Miami, Fla., plans expansion and improvements in steam-electric generating plant at St. Petersburg, Fla., including new turbine-generator unit and accessories, two boilers and auxiliary equipment; also extensions in transmission and distributing lines in that district. Cost close to $2,000,000.

South Carolina Electric & Gas Co., Columbia, S. C., has begun expansion and improvements at power plant at Parr Shoals, about 25 miles from Columbia, including additional equipment. Entire project will cost over $1,000,000.

South Central

• **Standard Oil Co. of Louisiana,** 2134 St. Charles Avenue, New Orleans, has acquired 75 acres near oil refinery at Baton Rouge, La., for new synthetic rubber mill, utilizing petroleum products from refinery for part of raw material requirements. It will consist of several one-story units, with power house, machine shop and other structures. Cost close to $1,000,000 with equipment.

Southern Bell Telephone Co., Atlanta, Ga., has leased one-story building, 115 x 140 ft., to be erected by Eighth Avenue Realty Co., Birmingham, at Eighth Avenue and Ninth Street, for equipment storage and distribution, with repair shop and service facilities. Cost over $60,000 with equipment.

Coca-Cola Bottling Works Co., 1507 Dana Avenue, Cincinnati, has asked bids on general contract for new one-story mechanical-bottling, storage and distributing plant, 80 x 100 ft., at Maysville, Ky. Cost close to $50,000 with equipment.

Smooth Setting
POSITIVE ACTION

Two requisites for efficient crane service are . . . smooth setting and positive action. They account for fraction-of-an-inch load spotting and complete control over every crane movement. They are outstanding features of every MARION crane. • Write for detailed information about these and many other Marion crane features.

THE MARION STEAM SHOVEL COMPANY
Marion, Ohio, U. S. A.

MODERNIZE with

MARION CRANES

SHOVELS • DRAGLINES • CLAMSHELLS • PULL-SHOVELS • WALKERS

From 3/4 cu. yd. to 35 cu. yds.

Southwest

● **Missouri Bridge & Iron Co.,** Fullerton Building, St. Louis, fabricated steel products, has purchased about 15 acres on LaPorte Highway, Pasadena district, Houston, Tex., for new branch plant, comprising main one-story fabricating works and adjoining buildings for storage, distribution and other service. Cost over $85,000 with equipment.

Terminal Railroad Association, Union Station, St. Louis, plans new one-story engine house, with shop facilities, 150 x 165 ft., at Fourteenth and Poplar Streets. Cost over $65,000 with equipment. H. J. Pfeiffer is chief engineer.

Monsanto Chemical Co., 1700 South Second Street, St. Louis, has let general contract to Fruin-Colnon Contracting Co., 408 Olive Street, for one-story addition, 50 x 56 ft., to power house, for expansion in turbine department. Cost over $75,000 with equipment. Stone & Webster Engineering Corp., 49 Federal Street, Boston, is consulting engineer.

Board of Directors, University of Wichita, Wichita, Kan., has asked bids on general contract for one-story addition, for an aeronautical building. Cost over $40,000 with equipment. Lorentz Schmidt, 1822 East Second Street, is architect.

North American Aviation, Inc., Inglewood, Cal., airplanes and parts, has let general contract to Austin Co., Houston, Tex., for branch plant near Hensley Field, Dallas, Tex. Cost close to $6,000,000 with equipment.

Western Pa. District

● **General Electric Co.,** Schenectady, N. Y., has let general contract to Sessinghaus & Ostergaard, Inc., 1115 Peach Street, Erie, Pa., for one-story addition, 315 x 400 ft., to electric refrigerator cabinet plant at Erie. New unit will be used in part for storage and distribution. Cost over $350,000 with equipment.

United States Engineer Office, Huntington, W. Va., asks bids until Sept. 10 for four pumping stations and auxiliary structures for section No. 1, local protection project for river floods (Circular 41).

Pennsylvania Railroad Co., Buffalo Division, Seneca and Louisiana Streets, Buffalo, plans new coal wharf at Emporium, Pa., with mechanical-loading and handling facilities; also extensions and improvements in engine house and shops at yards at Ebenezer, N. Y.

Ohio and Indiana

● **Standard Oil Co. of Ohio,** Midland Building, Cleveland, has authorized expansion and improvements in local No. 1 oil refinery, with polymerization unit and other equipment for expansion in gasoline division. Award for part of equipment has been made to M. W. Kellogg Co., New York, and contracts for other machinery will be placed soon. Steel tank storage facilities will be enlarged. Company also will carry out similar expansion at refineries at Latonia and Lima, Ohio. Entire project will cost close to $1,000,000.

Aeroproducts Division, General Motors Corp., 228 East First Street, Dayton, Ohio, aircraft propellers, etc., will take bids soon on general contract for new plant near municipal airport, Vandalia, comprising main one-story unit, 60 x 260 ft., and two-story and basement office and operating structure, 100 x 200 ft. Cost over $400,000 with equipment. Engineering department of Argonaut Realty Division, General Motors Corp., Detroit, is engineer. Company recently has let contract to Frank A. Messer & Sons, Inc., 2515 Burnet Street, Cincinnati, for one-story building at location noted, 70 x 135 ft., for a propeller testing division. Cost over $80,000 with equipment.

Delco-Remy Division, General Motors Corp., Anderson, Ind., automotive starting and lighting equipment, plans one-story addition, near recently completed No. 3 plant unit, for production of aluminum castings for aircraft engines of Allison Engineering Division, Indianapolis, affiliated interest. Cost over $250,000 with equipment.

Coca-Cola Bottling Works, 508 South Third Street, Goshen, Ind., will take bids soon on general contract for new two-story and basement mechanical-bottling, storage and distributing plant. Cost close to $80,000 with equipment. Philip Weisenburgh, Architects' and Builders' Building, Indianapolis, is architect.

Michigan District

● **Wilcox-Rich Division of Eaton Mfg. Co.,** 9771 French Road, Detroit, engine valves and other engineering products, has approved plans for one-story addition to branch plant at Saginaw, Mich. Cost close to $45,000 with equipment.

Duplex Truck Co., East Hazel Street, Lansing, Mich., commercial automobiles and parts, has let general contract to George Hagameir & Son, 525 North Grand Street, for one-story addition, 70 x 160 ft. Cost over $65,000 with equipment.

Dow Chemical Co., Midland, Mich., is arranging for sale of stock and bond issue to total about $25,000,000, considerable part of fund to be used for expansion in plants for extracting magnesium from sea water and for production of magnesium alloys (Dowmetal). Company has work under way on plant at Freeport, Tex., for magnesium extraction. Cost over $5,000,000.

Middle West

● **Diamond T Motor Car Co.,** 4517 West Twenty-sixth Street, Chicago, motor trucks and parts, has let general contract to J. W. Snyder Co., 307 West Michigan Avenue, for one-story and basement addition, 120 x 600 ft., partly for storage and distribution. Cost close to $225,000 with equipment. Armstrong, Furst & Tilton, 11 South LaSalle Street, are architects.

Chicago Flexible Shaft Co., 5600 West Roosevelt Road, Chicago, flexible shafts, electric household appliances and kindred products, has let general contract to Carl E. Erickson, Inc., 2847 North Clark Street, for two-story and basement addition, 70 x 100 ft. Cost about $75,000 with equipment. Olson & Urbain, 228 North LaSalle Street, are arcnitects.

Fairbanks, Morse & Co., 600 South Michigan Avenue, Chicago, diesel engines and parts, electric motors and allied equipment, will take bids soon on general contract for one-story addition, 80 x 220 ft., at branch plant at Beloit, Wis., for production of brass, bronze and other nonferrous castings. O. D. Conover, 1740 East Twelfth Street, Cleveland, is architect and engineer.

Chain Belt Co., 1600 West Bruce Street, Milwaukee, chains, sprockets, transmission equipment, etc., will take bids soon on general contract for two-story addition, 31 x 125 ft. Cost over $70,000 with equipment. Eschweiler & Eschweiler, 720 East Mason Street, are architects.

Pacific Coast

● **Consolidated Aircraft Corp.,** San Diego, Cal., airplanes and parts, plans one-story addition, about 300,000 sq. ft. of floor space, for expansion in parts production and assembling divisions. Cost close to $800,000 with equipment. Company is completing one-story extension for final assembling, representing investment of about $2,000,000.

Associated Oil Co., 79 New Montgomery Street, San Francisco, plans rebuilding of part of oil refinery at Avon, Cal., recently destroyed by fire, including lubricating oil acid-treatment works, steel storage tanks and other structures. Loss over $200,000 with equipment.

Construction Service, Veterans' Administration, Washington, asks bids until Sept. 24 for deep-well pumping machinery and accessories for institution at San Fernando, Cal.

C. F. Braun & Co., 1000 South Fremont Street, Alhambra, Cal., heaters and parts, valves, etc., have approved plans for one-story addition. Cost close to $100,000 with equipment.

Bureau of Reclamation, Denver, asks bids until Sept. 9 for anchor jacks for 25 and 30-ft. headers of steel outlet pipes at Boulder dam, Boulder Canyon project (Specification 1419-D).

Puget Sound Pulp & Timber Co., Bellingham, Wash., plans addition to sulphite pulp mill for capacity of 50,000 tons per annum. Cost close to $1,500,000 with machinery.

Boeing Aircraft Co., Seattle, plans one-story additions for expansion in parts production, assembling and testing divisions; also improvements in present works and equipment. Company has arranged for loan of about $7,000,000 through RFC for project.

Canada

● **Electric Steel, Ltd.,** 507 Place D'Armes, Montreal, has let general contract to Anglin-Norcross, Ltd., 892 Sherbrooke Street West, for new plant at Three Rivers, Que., for steel and alloy steel production. Cost close to $300,000 with equipment.

Canadian General Electric Co., Ltd., 212 King Street, West, Toronto, has asked bids on general contract for one-story addition to plant at Peterborough, Ont., 100 x 800 ft. Cost over $850,000 with equipment. John M. Lyle, 230 Bloor Street West, Toronto, is architect.

John McCroe Machine & Foundry Co., Ltd., Lindsay, Ont., machinery and parts, iron castings, etc., plans one-story addition. Cost close to $60,000 with equipment.

Department of Munitions and Supply, Ottawa, has awarded contracts for airplane factory at Fort Erie, Ont., to cost $275,000. Equipment installation is estimated at $500,000. Plant is being erected near factory of Fleet Aircraft Co., and will be used for manufacture of new type of airplane through cooperation with Fleet company.

Dominion Engineering Works, Ltd., First Avenue, Lachine, Que., awarded contract to Foundation Co. of Canada, Ltd., for addition to erecting shop, 85 x 200 ft., to cost $70,000. Other additions also are planned.

General Motors Corp. of Canada, Ltd., Oshawa, Ont., has awarded contract to Smith Brothers Construction Co., 1740 Ellen Avenue, Niagara Falls, Ont., for plant addition to cost $125,000.

Canadian Car & Foundry Co., Ltd., 21 Craig Street West, Montreal, has awarded contract to Foundation Co. of Canada, Ltd., for plant addition at Longue Pointe, Que., to cost $50,000.

Canadian Pratt & Whitney Aircraft Co., Ltd., Longueuil, Que., has awarded general contract to A. F. Byers & Co., Ltd., 1226 University Street, Montreal, and has closed number of sub-trades in connection with plant addition to cost $75,000.

Canadian Associated Aircraft, Ltd., 1050 Beaver Hall Hill, Montreal, has awarded several sub-contracts in connection with aircraft factory addition at St. Hubert, Que., to cost $80,000.

Canadian National Railways, 360 McGill Street, Montreal, has awarded contract to Fundy Construction Co., Isleville and Russell Streets, Halifax, N. S., for terminal and locomotive erecting shops at Fairview, N. S., to cost $300,000. W. U. Appleton, Moncton, N. B., is district manager.